THE MEDICAL NEWS.

A WEEKLY JOURNAL OF MEDICAL SCIENCE.

VOL. 85. NEW YORK, SATURDAY, NOVEMBER 12, 1904. NO. 20.

ORIGINAL ARTICLES.

HEPATOPTOSIS COMPLICATED BY GASTROPTOSIS; A SUGGESTION AS TO TREATMENT.

BY ELLSWORTH ELIOT, JR., M.D.,

OF NEW YORK.

THE movement manifested by the various abdominal viscera may be either physiological or pathological. In the former instance, the degree of movement varies widely, being most pronounced in the hollow viscera, particularly in the alimentary canal, where it contributes largely to the proper performance of the functions of digestion and assimilation; it is least marked in the solid viscera where the movement referred to is largely respiratory, being due to the descent of the diaphragm.

In the hollow viscera the range of movement depends almost entirely upon the peritoneal relations of each individual organ, being most extensive in those organs supplied by a generous mesentery. On the other hand, in the solid viscera, the comparatively slight range of movement is explained by the absence of such a mesentery, as well as by the attachment of the viscus, at a point where it is not covered by peritoneum to the contiguous portion of the abdominal wall. Even in such an organ as the spleen, which is completely invested by peritoneum and is supplied by a mesentery, nature has evidently intended to curtail its movement, certainly in a downward direction, through the medium of the costocolic ligament.

The exercise of this movement, whether of hollow or solid viscus, does not affect the normal relation of the organ to the abdominal wall or to the contiguous viscera. At the conclusion of such a movement the quiescent viscus returns to that position in the abdominal cavity in which it properly belongs. On the other hand, when for any reason the normal relation is disturbed, such restitution may prove impossible, and the viscus once displaced may occupy an increasingly lower position in the abdominal cavity.

Such a condition may be due to various causes. In the first place, abnormal elongation of mesenteric attachment may occur, whenever, for any reason, the abdominal walls are unduly stretched, as in pregnancy, a fact which accounts for the prevalency of this condition in women.

Secondly, such abnormal range of movement and displacement may be due to the development of weakness in the extraperitoneal attachment of the viscus to the abdominal wall. Thus, in the case of the liver, the gradual diminution in the fatty tissue between the layers of the coronary ligament or in the case of the kidney, a similar decrease in the amount of perinephritic fat, predispose to downward displacement of these viscera.

Thirdly, a lack of tone in the viscus itself. This refers particularly to the hollow viscera. Here, when for any reason, the muscular tone of the affected organ becomes depreciated, either through disturbance of the general nutrition or from some irregularity in its nervous mechanism, a permanent displacement may occur.

Fourthly, gravity is a most potent factor in leading to displacement only when combined with one or more of the previous conditions. Under these circumstances an existing displacement is materially aggravated.

Such displacement may be limited to one organ or involve several simultaneously. Occasionally there is a general enteroptosis. In these cases weakness of the diaphragmatic attachment of the liver develops, and the consequent descent of that relatively heavy organ necessarily causes a downward displacement of all the abdominal viscera. It is not at all unlikely, that with the correction of the malposition of the liver the organs affected by its displacement, especially the right kidney and the stomach, right themselves without further treatment.

The symptoms associated with displacement of one or more viscera are very variable and may be divided into two general groups: (1) Those referable to the displacement of the individual viscus; (2) those of a reflex nature due to interference with the proper working of the abdominal nervous system. The former, not infrequently, absent, consist of local pain, together with symptoms indicating interference with the proper working of the organ involved. Thus, in case of the liver, attacks not unlike those of a typical biliary colic may occur, with or without moderate jaundice. In the stomach, nausea, loss of appetite, vomiting, evidences of defective gastric digestion with marked gastralgia very frequently develop. On the other hand, with the displacement of the kidney, symptoms due to the functional disturbance of that organ occur only when, from its malposition, mechanical interference with the outflow of urine results in intermittent hydronephrosis.

The latter group of symptoms, namely those due to reflex nervous disturbance, are usually well developed. The frequent occurrence of these symptoms in displacement of the uterus is very generally recognized. Similar symptoms of even more pronounced character and of wider distribution may be expected to occur in displacement of the abdominal viscera, for a larger number of nervous ganglia are affected, both by the pressure of the displaced organ and the tension to which the displacement subjects them.

The individual symptoms of this group are so well known that they require no special mention.

The objective symptoms may be elicited by direct examination. Thus the lower edge of the liver may be felt to extend a variable distance below the free border of the costal arch. The downward displacement of the stomach may be mapped out by percussion, after it has been inflated or partially distended with fluid. Analysis of stomach contents also gives valuable information. In nephroptosis, the kidney is readily felt by bimanual palpation, and the degree of excursion of its abnormal movement easily determined. The displacement of the solid viscera can always be recognized with greater facility after the patient has been walking, than if the patient has for some time previously been in the recumbent position.

The treatment is prophylactic and curative.

Prophylactic treatment includes all measures calculated to maintain the tonicity of both the abdominal wall and the abdominal viscera. Among the most important may be mentioned regular and suitable exercise, careful attention to the functions of digestion and assimilation, and in general the observing of a well-regulated hygienic habit of life. In women especially, where the persistence of weakness of the visceral ligaments after pregnancy is a part of a general subinvolution, should these precautions be observed.

The curative treatment is both medical and surgical. Medical treatment consists in the application of the general principles just enumerated together with local treatment directed to the displaced viscus. In case of displacement of the stomach, lavage, electricity with small doses of strychnine and arsenic to improve the tone of its muscle wall, are most likely to prove of service when that organ only is involved, and when the liver maintains its proper relation to the diaphragm. Similarly with the kidney, the generous exhibition of fats both in diet and by the administration of cod-liver oil may afford relief by increasing the general strength, as well as the strength of the fatty capsule of the affected organ. Again, however, the chances of a permanent cure are slight, if displacement of the liver exist, for the upper pole of the right kidney (the one usually affected) is in contact with the under surface of the liver, and any movement downward of that viscus must necessarily be transmitted to the kidney beneath. The descent of the kidney in these subjects may occasionally be checked by the wearing of a well-fitting pad.

In all these cases, particularly when nervous symptoms develop, general benefit is derived by continued rest in bed. By this means, gravity as an etiological factor, is eliminated, or may be even utilized to effect the return of the displaced organ to its proper position by raising the foot of the bed. This is especially true of the solid viscera. With the recovery of the patient recurrence is less likely if some occupation is selected that does not necessitate continued and protracted standing in the same position.

The surgical treatment varies according to the organ affected. The object of this paper is to call attention to a new method of operation in those cases where, with gastroptosis, there is a descent of the liver as well. Hitherto, with or without this complication, attempts have been made to relieve the gastroptosis by suture of the stomach to the anterior parietal peritoneum, and in a few cases by a reefing or shortening of the gastrohepatic omentum—attempts that have resulted in no material benefit to the patient. The chief objection to either of these methods seems to be that, when the liver descends, the weight of that organ continues to be exerted against the stomach and thereby interferes with its function as well as the function of the other viscera that are pressed down into the abdominal cavity. The object of the operation here suggested, is to anchor the liver so securely in its position that the displaced stomach and other abdominal viscera will be relieved of its superincumbent weight, and will then with or without general therapeutic measures return more or less completely to their normal position, with a corresponding improvement in their function.

The operation consists in the exposure of the liver and stomach through a median incision above the umbilicus. The obliterated umbilical vein, forming a thick cord in the free edge of the falciform ligament, is then identified and drawn forward until it comes in contact with the parietal peritoneum. The hepatic extremity of the ligament then rests against the under surface of the right lobe of the liver in front of the transverse fissure. The lower or umbilical extremity is in close contact with the anterior parietal peritoneum, the two portions of the ligament now forming a right angle. In this position the round ligament is sutured to the anterior parietal peritoneum with chromic gut and the redundant falciform peritoneal reflection is spread out laterally and sutured to the contiguous portion of the parietal peritoneum with the same material, in this way forming a species of shelf for the under surface of the liver. The abdominal wound is then closed in layers.

REPORT OF CASES.

Case I.—M. L., female. Admitted to the Presbyterian Hospital, March 23, 1904. Patient has always enjoyed good health until four weeks previously. At that time, without known cause, she developed pain in the epigastrium which was more marked on the right side, and which confined her to bed for one week. Ten days previous to admission the pain recurred and increased in severity, being especially severe for the past two days, and of a sharp, knife-like character. Four days before vomiting appeared, the vomitus consisting of the contents of the stomach, and after that the patient was unable to retain food of any kind. During this same time the bowels were

constipated. Two days previous patient became feverish and simultaneously jaundice appeared. On both days chills occurred. On admission, temperature was 104° F., the pulse 110. Shortly after admission the patient developed a severe chill, the temperature rising to 107° F., the pulse to 120.

On examination, the abdomen was flaccid and moderate tenderness and rigidity were elicited in the upper right quadrant near the border of the costal arch. There was also some rigidity of the corresponding portion of the arch. Extending a distance of two inches below the level of the umbilicus, the free edge of the right lobe of the liver could be felt. The urine was normal, save for a heavy trace of bile. There was a considerable amount of jaundice. There was a leucocytosis of 15,000, gradually decreasing and reaching normal at the end of a week, also a slight pharyngeal cough with a moderate whitish expectoration.

On the day of admission patient vomited after taking a little water, which was repeated later in the evening. On the day after admission, the temperature fell to 103.5° F., thereafter decreasing gradually day by day, reaching normal in about ten days. An enema was administered with a large brown result. There was no further vomiting.

Five days after admission, patient had a severe attack of tachycardia, the pulse reaching 250 (counted with the stethoscope over the apex), decreasing the following morning to 180 (with the administration of digitalis) and thereafter decreasing to normal. There was no corresponding rise in the temperature. With the subsidence of the attack of tachycardia, the general condition of the patient improved. The appetite improved, the bowels became less constipated, the jaundice decreased and then disappeared, and by successive examinations the edge of the liver was felt to rise above the level of the umbilicus, to a distance of about two inches below the costal arch. At the end of three weeks, the patient was allowed to sit up in a chair and shortly after to walk. A few days thereafter she was discharged from the hospital.

The patient has been examined at intervals of two weeks since her discharge. She has been able to do light housework and there has been no recurrence of any of her former symptoms. The edge of her liver has, however, returned to a position below the level of the umbilicus.

Case II.—M. P., forty-one years old, female. Admitted to the Presbyterian Hospital November 30, 1903. Patient has had three children and three miscarriages, the youngest child being now eight years old. Has always enjoyed excellent health. One year ago pain developed on the right side of the abdomen. This was increased on exertion and at times extended down the right leg, being so severe as to confine the patient to bed. For the last three months patient was unable to attend to household duties, and for the past six weeks vomiting after eating was frequent, intensifying the pain. During the same time she suffered from severe abdominal cramps with distention and has been unable to sleep. During the previous three months she lost much strength and forty-two pounds in weight. The chief complaints were pain, vomiting and general weakness.

Examination.—The abdomen was of average size, soft, of poor general tone and moderately distended. Stomach tympany extended below to within one and one-half inches of the crest of the ilium, crossing the median line one inch below the umbilicus, and the free border of the costal cartilage at the tenth rib. The lesser curvature crossed the epigastrium one inch below the ensiform and extended as high as the seventh rib in the left hypochondrium. The liver descended in the right hypochondrium a distance of two inches below the free border of the costal arch. A peristaltic wave could be seen at intervals passing from left to right just below the umbilicus. The stomach contained free hydrochloric acid both before and after operation. Prior to operation, examination of stomach contents showed many starch granules, fat globules, granular detritus and epithelial cells.

December 9.—Patient has been in bed since admission, with lavage and general tonic treatment without showing any improvement.

Operation. Gas and ether.—On opening the abdominal cavity, the liver was found to extend two inches below the free border of the costal arch, the greater curvature of the stomach to lie opposite the level of the umbilicus, the stomach itself to be moderately dilated. The stomach was sutured to the anterior parietal peritoneum on either side of the median line with two rows of chromic gut sutures, and after denudation of the opposed peritoneal surfaces of the liver and diaphragm, the round ligament was treated in the manner described in the earlier part of this paper. Complete closure of the abdominal wound followed.

There was very slight reaction, the wound running the ordinary course of those which heal primarily. The amount of postoperative vomiting was no more than that observed in the usual laparotomy. By the seventh day all discomfort after eating had disappeared, and the patient experienced no further abdominal pain or cramps. There was progressive improvement, and she was discharged at the end of four weeks, after she had been walking around the ward for a week without any return of her symptoms. To permit of the approximation of the denuded liver and diaphragmatic surfaces, the patient was kept in the Trendelenburg position for two weeks after the operation. Two months after operation patient had been attending to her household duties for some weeks. She experienced occasional slight pain after eating. She gained ten pounds after her discharge from the hospital. Six months after operation, the patient was mak-

ing daily trips of more than six miles between her residence and place of business. She continued to enjoy good health.

Case III.—M. K., thirty-eight years old, female. Admitted to the Presbyterian Hospital December 7, 1903. Patient had had two pregnancies, nine and seven years before. Eighteen years previously she had an attack of severe pain in the epigastrium, with jaundice, confining her to bed for three weeks. A similar attack occurred three years before admission with severe pain in the right hypochondrium, and vomiting. The jaundice persisted for a month. In November, 1900, a ventral fixation was performed by me at the Presbyterian Hospital. At that time there was retroflexion and some menstrual difficulty, which was relieved by the operation. April, 1903, the patient had an attack of fainting, with chills and fever, and severe pain in the back, but no vomiting or jaundice. Since then she has had frequent attacks of fainting, with abdominal pain, experienced after eating, and occasional jaundice. For several months past she has been unable to do any heavy work.

On examination, the wall of the abdomen was soft and retracted. The lower border of the liver could be felt two inches below the free costal margin. On bimanual examination, in the right lumbar region, the right kidney could be felt to be slightly movable.

Operation. Gas and ether.—On opening the abdominal cavity, the transverse fissure of the liver was found to be in close contact with the lesser curvature of the stomach. The greater curvature was opposite the umbilicus. The right kidney enjoyed an excursion of two inches during inspiration. The gall-bladder and ducts were normal. The liver was raised a distance of two inches by suture of the round ligament, and the abdominal wound was closed after denudation of the opposed peritoneal surfaces of the diaphragm and liver. Trendelenburg position.

There was no unusual nausea or vomiting. The bowels moved on the third day. The pain decreased and disappeared with steady improvement of the appetite. At the tenth day, slight pain in the back alone remained. The patient continued to improve and left the hospital in excellent condition. Six months after the operation, patient enjoyed very good health. There was occasional pain after eating and some obscure pain low down in the pelvis, but her general condition remained greatly improved.

These cases are of very considerable interest. In the first case, no operation was performed, the patient having always been well to within a short time of the original attack. Here conservative measures proved successful in relieving the attack, notwithstanding a very severe and unusual attack of tachycardia. It is interesting to note that, shortly after she had assumed the vertical position, the liver returned to the position that it occupied at the time of the patient's admission to the hospital and that this occurred without any return of the previous symptoms. Whether a relapse will occur or not is purely a matter of conjecture. Too short a time has elapsed to regard the patient as permanently cured.

In the second case the stomach symptoms were very sharply developed and the resulting loss of flesh and strength were as great as in any case of carcinoma. The patient desired to avoid an operation if possible, yet her condition became so deplorable, that finally she was eager for any procedure that might afford relief. The good effect of the operation might be said to have been almost instantaneons. After the subsidence of the discomfort that is observed after any laparotomy, she experienced almost complete relief and began to relish and assimilate food in considerable quantities. Whether in this case, the good result can be ascribed to the suture of the stomach or to the elevation of the liver, or simply to the rest in bed, is a matter of doubt. The total failure of gastrorrhaphy to afford even temporary relief in other cases of this description, together with the sudden change directly after the operation, when a week's rest in bed prior to the operation had not materially changed the patient's condition, seem to warrant the belief that the shortening of the round ligament was instrumental in effecting the noted improvement. In the third case, the symptoms rather pointed to some form of cholelithiasis, but the physical examination of the liver revealed its low position and the laparotomy made the diagnosis certain. Again, in this instance, the result at the expiration of six months may be regarded as satisfactory. It is also interesting to note, in this case, the examination of the uterus showed it to be firmly secured to the anterior abdominal wall by a mesial and anterior ligament about two inches square, the result of the prior ventral fixation.

In conclusion, the writer does not desire to belittle the importance of medical measures. These should be always carried out wherever it is possible, and only when the condition of the patient ceases to improve is it wise to resort to surgical treatment. The writer wishes also to still further emphasize the fact, that the method suggested must not be expected to afford relief in all cases and that the results in the cases herewith published six months after operation must not be regarded as final. The fact remains, however, that a very marked improvement was secured in the two cases treated by this method, and this improvement seems to warrant the early publication of this paper in order that others may be induced to try the same procedure. For it is only by that means that an accurate estimate of its true value can be obtained.

48 West Thirty-sixth Street.

Gifts to Mineola Hospital.—It has just been announced that Mrs. W. K. Vanderbilt, Jr., has given to the Hospital Association of the above institution $2,000, to be used for repairs. Mr. W. B. Leeds, another friend of the hospital, also recently gave $2,000.

RACES AND PEOPLES WITH REGARD TO TUBERCULOSIS.

BY JOHN B. HUBER, A.M., M.D.,
OF NEW YORK.

THE negro is exceedingly prone to consumption, which destroys every other adult among his people. It would seem, however, that this disease was unknown among the original blacks in Africa until within comparatively recent generations, when the exploring whites decided to confer upon them certain prearranged blessings of civilization. Their immunity was probably due to the fact that barbarism does not suffer the disadvantages of badly-ventilated, badly-drained houses, indoor life, factory work and like conditions of civilization upon which tuberculosis thrives.

Harris (*Journal American Medical Association*, October 3, 1903) declares that before the Civil War tuberculosis was almost unknown among the slaves; that it does not occur on the West Coast of Africa, except when it has been imported by the white race and acquired by the negroes living a semi-civilized life. Millard states: "I have excellent authority for saying that the disease is rare among the negroes in Africa, and in the interior is almost never known." Flick considers that the negro race in Africa was free from consumption until its members began to associate with other races.

No doubt tuberculosis has taken the same course among the negroes as did measles among the Fijis. Measles were entirely unknown among these people until some whites who came there introduced it. On account of this the aboriginal inhabitants died off in enormous numbers of this disease, which is now comparatively innocuous among us—40,000 Fijis in a population of 150,000. This exemplifies the established fact that a given infection acquires an unusual malignancy when for the first time it invades a race previously immune. On the other hand, an infection tends to lose its virulence in the course of centuries, as with the Jews, who are singularly less prone than other races to tuberculosis (Billings, Korosi, Fishberg, Hoffman).

Flick considers that the history of consumption in all new countries into which it has been introduced, shows that it has had a rise, a climax and a decline in prevalency, citing the experience in the islands of Madeira and Bermuda, and the progress of the disease from east to west in the United States in illustration of his view. In New York City, from 1804 to 1820, the deaths from consumption were one in 4.2; from 1820 to 1835, one in 5.4; from 1835 to 1850, one in 6.5, and from 1848 to 1859, one in 8.4. In Rhode Island the percentage of deaths from consumption was in 1867, 20.74; in 1883, 15.03. The mortality statistics of the older States and cities show in the same way a progressive decrease; those of the newer States and the Territories show either a standstill or a decrease. "The avidity, however, with which the disease takes hold of new material illustrates its subservience to the law of acclimatization better even than its history in different countries. "It has decimated," declares Flick, "the natives of probably every island which has been colonized by England during the last few hundred years." The native-born African negroes have thus suffered terribly from it. In Egypt the negroes and Abyssinians are decimated by it. In Gibraltar, for twenty years the comparative deaths between whites and blacks have been, per 1,000: Whites, 6.1; blacks, 33.5. During the early American slave trade the proneness of the negro to consumption was noted by Rush and others.

Certain habits of the negro are certainly predisposing. I have been informed by our Consul at Nassau (New Providence) that it is a custom among the negroes in that region, no matter how hot the nights might be, to keep the doors and windows of their huts tightly closed, and to burn lamps or candles throughout the night, to keep the evil spirits out and to scare them away. Such superstitions as these are common also, I believe, among negroes in our Southern States. The negro, moreover, eats much pork, and swine are among the tuberculous animals. To say the least, this is an unhygienic diet for hot regions. The negro is said to be inordinately addicted to alcoholism; if so, this factor should predispose more than among the whites, for the same reason that obtains among the Indians, to whom we will presently refer.

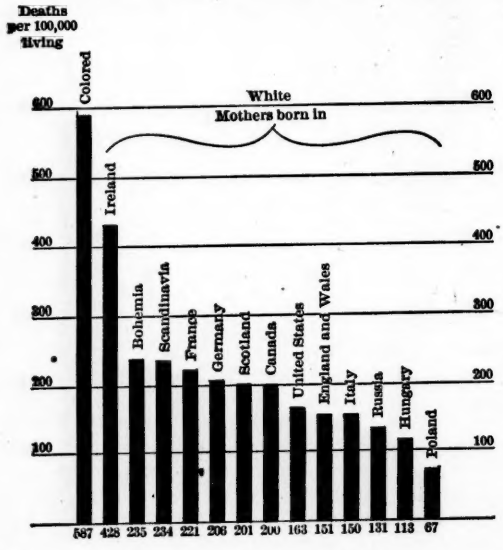
Coleman declares the negro to be ignorant of hygiene and adverse to water; that his food is often insufficient and unwholesome, and unsuited to the climate in which he lives; his clothing is unhealthful; he is shiftless and improvident. Syphilis and gonorrhea, by weakening his system, render him susceptible to tuberculosis. Many a negro now works indoors, and the houses in which he lives are overcrowded—unfortunate conditions, since the tendency of his race has been agricultural and toward out-of-door life.

Harris considers that the negro's small lung capacity, as compared with that of the white, and his deficient brain capacity render him less resistant to the disease when once acquired. Where the two races live together, three times as many negroes as whites die from tuberculosis. And Harris and Coleman both conclude that unless the hygienic and moral surroundings of the race are improved, there is danger of extinction.

It seems that the Indian was free from tuberculosis before his contact with the whites, living as he did in the open air and without alcohol. The "fire water" introduced by the white man (a most vicious, impure, cheap and harmful form of alcohol) has certainly been a large factor, all the more for the reason that the whites have, through many previous centuries, rendered themselves comparatively seasoned with regard to this stimulant, to which the Indian has not yet accustomed himself.

Rush stated, more than a century ago, that consumption was then unknown among the Indians of North America. Flick considers that prior to the advent of the white man—and especially the Englishman—consumption did not exist among the American Indians. Whenever England colonized the Indians took the disease, so that in the course of time it became even more prevalent among them than among the whites. The disease increased from east to west. John D. Hunter, Esq., who was for fifteen years a captive among the Indians, wrote in 1822: "I have known pulmonary consumption to occur among the Indians. It is rarely seen, however, except in those who are addicted to intemperance, and even in those cases it is by no means as common as among the whites. It is worthy of notice that their females are not as much subject to the disease as the males are."

In 1854 George B. Buckley reported that In-



dians east of the Rockies suffer from inflammation of the eyes and consumption. In 1870 Dr. Thomas Williams wrote of the Dacotas, of Minnesota, that "of those over ten years who die of disease, I think one-half die of consumption." It has almost exterminated some American tribes.

The death rate from consumption among Chinese in this country is, I believe, very high indeed. As regards New York City, their dreadfully unhygienic living, their sleeping in bunks, in vitiated atmospheres, their overcrowding, their addiction to opium and other enervating vices, and like circumstances abundantly explain their high mortality from tuberculosis.

Miss Lillian Brandt, to whom I am indebted for the accompanying diagram, has supplied some interesting data in the "Handbook on the Prevention of Consumption" of the Charity Organization Society. The high mortality among the Irish people is no doubt due to the inordinate alcoholism which obtains among their poor, their careless, improvident nature, their inheritance of poverty through many generations, and the overcrowding among them in our tenements.

The Bohemians come next, though a long way behind; their habit of congregating in cities, their unhealthful housing conditions, and their indoor occupations explain their mortality rate.

The Scandinavians are reputed a healthy race, and so no doubt they are at home. However the effect of new climatic conditions upon them, and the formation of a radically different physical type in the second generation may account for their comparatively high mortality in this country. Until we reach the Italians the conditions are such as prevail in civilization generally, and no observations are strictly pertinent in this place.

We would expect a higher mortality among the Italians, for their indoor life in this city is very unhealthful, they are exceedingly dirty and they are said to be much underfed. Moreover, being an ignorant and superstitious people, and no doubt fearing often the imaginary terrors connoted by registration, they are given to concealing their cases; so that by no means all are reported. This observation probably applies to many of the fifty odd tongues represented in New York City. Many Italians want to die in their fatherland; so that many cases no doubt leave for home before they become very bad indeed. Many poor Italians work in this country during the summer months and return to Italy in the fall. There are, for instance, many such transported in the steerage of the Netherlands-American steamship line. Besides the Italian's nature is sunny, not given to worry, and these people are largely engaged in outdoor work, peddling and upon public roads, etc.

The Hungarians, the Russians and the Poles in New York are mostly Jews. We observe that these peoples have the lowest death rate. It would seem that the Jewish race, here as elsewhere, suffers less from consumption than any other, except perhaps the Quakers. And this is all the more strange, because the Jewish race, in New York City at least, seems to be subject to pretty nearly every possible condition conducive to tuberculosis. I would attribute their low death rate, in large measure, to three main factors:

They are said to be a temperate people with regard to alcohol, which they take in moderation. The Jews are seldom drunk; "they have no drink problem." Again it would seem that the Jewish race has in the forty centuries of its existence established for itself a comparative immunity to this disease.

And lastly, there is their obedience to the Mosaic Laws regarding kosher food, which laws are, I understand, very faithfully obeyed by the poor Jews. The Jew would thus be not so likely to consume tuberculous food stuffs.

THE CONSUMPTION AND ELIMINATION OF WATER IN DRY AND MOIST CLIMATES, WITH SPECIAL REFERENCE TO THE CAUSE OF BRIGHT'S DISEASE.[1]

BY WILLIAM S. CARTER, M.D.,
OF GALVESTON, TEX.;
PROFESSOR OF PHYSIOLOGY, UNIVERSITY OF TEXAS.

FOR a considerable time it has been felt by the physicians and people of Galveston that Bright's disease is more prevalent in this city than in most communities. The reports of the John Sealy Hospital of Galveston do not show the proportion of cases of Bright's disease in the medical wards, to be any greater than in the hospitals of other cities. A comparison of the mortality statistics, however, shows that there are more deaths from Bright's disease in proportion to the total number of deaths than in most cities, in spite of the fact that the mortality rate (per thousand of population) is remarkably low. With the exception of New York City, the percentage of deaths from this cause is nearly double that of most of the large cities in various parts of the country.

This condition is commonly attributed to climatic conditions—to the high degree of relative humidity, together with the long season of warm weather. Different theories have been advanced to explain how these conditions could possibly produce disease of the kidneys. Some contend that this atmospheric condition interferes with evaporation from the skin and throws greater work upon the kidneys; others hold that in the effort at heat regulation the sweat glands are more active, resulting in a concentration of the urine, which causes irritation of the kidneys and possibly interferes with renal excretion.

The observations presented in this paper were undertaken with the object of determining the influence of dry and moist climates upon the amount of water consumed, and the amount given off as urine, and whether or not there is any relation between the prevalence of Bright's disease and the climatic conditions.

The first observations were made by the writer upon himself over a period of six days in Boulder, Colorado, at an altitude of 5,400 feet above sea level, and these were contrasted with similar observations in Galveston at the sea level. The former observations were made in July; the latter in September. While the weather was a little warmer during the series in Galveston, the difference of temperature was not so great as the difference in humidity. No effort was made to take fluid at regular intervals or to take a uniform diet, but the natural inclinations were followed in this regard and the amount of fluid taken as a drink recorded. These were not added up until after the series was completed so that no mental factor could enter into the results in any way.

TABLE I.

Observations in Boulder, Colorado, July 17 to 22. Altitude 5,400 feet.

Number and date of observation.	Dry bulb thermometer. Fahrenheit.	Wet bulb thermometer. Fahrenheit.	Dew point.	Relative humidity (per cent.).	Barometric pressure (mm. Hg).	Amount of water as drink in c.c.	Amount of urine in c.c.	Sensible perspiration.	REMARKS.
I July 17, 1899..	72.5°	65.5°	60°	65.5	615	1550	1350	Slight.	Three-quarter hour active exercise in walking.
II July 18, ...	69.3°	62.5°	57.3°	65.6	616	1950	1750	Slight.	Two hours walking.
III July 19, ...	74°	61°	52°	41.2	614	2100	1550	Some during exercise.	One hour active exercise in bicycle riding. One-half hour bicycle ride.
IV July 20, ...	75.5°	61.5°	51.5°	43.2	611	1950	1325	Some.	One hour in walking. Weather clear and pleasant as in Observations III and IV.
V July 21, ...	.....	....	....	....	...	2000	1225	None.	
VI July 22, ...	76.5°	63.5°	54°	45.5	613	2100	1225	Slight.	.....
					Average	1940	1404		

The conditions were very similar in regard to exercise, etc. Coffee was taken once a day, with breakfast—an average of 165 c.c. in Boulder and 300 c.c. in Galveston. If the difference in the amount of coffee consumed had any effect, it should have caused greater activity of the kidneys during the series of observations in Galveston. By strange coincidence the average of the six days in Boulder and that of the nine days in Galveston, show that exactly the same amount of urine (1,404 c.c.) was passed in both series. The average daily amount of water taken as drink was 2,140 c.c. in Galveston, while that in Boulder was 1,940. This means that the moisture given off by the lungs and skin in the moist climate exceeded that given off in this way in a dry climate by 200 c.c. From September 18 to 24, there was a Texas "norther," *i.e.* cool, dry breezes from the north prevailed and there was very little sensible perspiration as the weather

[1] Read before the Section on Pathology of the Texas State Medical Association, April 30, 1904.

was pleasant. During this time there was little difference between the water consumption and elimination in Galveston, as compared with that in Boulder. During the first and last days of the obesrvations in Galveston the weather was hot, sultry and uncomfortable, causing considerable sensible perspiration, and during these days more water was consumed and less was given off in the urine.

The observations of temperature, pressure and humidity were made in the middle of the forenoon and in the middle of the afternoon in the series in Boulder, and a mean of these is given in the table. Similar observations were made every three hours from 8 A.M. to 11 P.M. in the Galveston series, and an average of these is given in the tabulation.

These observations are open to the objections (1) that they were made upon a single individual, and (2) that there was not only a difference of humidity, but also a vast difference in atmospheric pressure, as Boulder is nearly one mile above sea-level, and the latter might influence the circulation and possibly metabolism. To overcome these objections arrangements were made to carry on observations simultaneously upon three men in good health in San Antonio, and also upon three healthy adults, besides the writer, in Galveston. These were made in September, 1903, and to compare the climatic conditions the officials of the United States Weather Bureau at both of the stations have very kindly furnished three daily observations as to temperature and humidity during this period. San Antonio is only about 700 feet above sea-level, and in general it may be said there is little difference in

TABLE II.

Observation in Galveston, Texas, at Sea-Level. September, 17 to 25.

Number and date of observation.	Dry bulb thermometer. Fahrenheit.	Wet bulb thermometer. Fahrenheit.	Dew point. Fahrenheit.	Relative humidity (per cent.).	Barometric pressure in mm.	Fluid as drink in c.c.	Amount of urine in c.c.	Specific gravity.	Sensible perspiration.	Active exercise.	Remarks.
VII September 17..	86.3°	78.6°	73.6°	66	759	2550	850	1031	Large amount.	One-half hour bicycle ride.	Weather hot, sultry and uncomfortable.
VIII September 18..	78.5°	73.5°	70°	76	759	2000	1825	1015	Some.	One-half hour walking. One-half hour bicycle ride.	Weather pleasant. "Norther" during night.
IX September 19..	77°	68.3°	62°	60	761	1900	1700	1012	None.		Weather cool and pleasant.
X September 20..	77°	66.7°	59°	54	763	2100	1050	1021	Very little during exercise.	.....	Weather remains the same.
XI September 21..	78°	66°	57°	50	765	2050	1435	1018	.....	.....	Weather remains cool and pleasant.
XII September 22..	78°	66.7°	59°	52	764	2700	1950	1012	Very little.	One hour bicycle ride.	Weather pleasant.
XIII September 23..	78.3°	69.4°	63°	60	764	2000	1550	1013	Some during exercise.	One hour bicycle ride.	Weather pleasant.
XIV September 24..	81°	71.3°	65°	57	761	1950	1500	1012	Very little.	.....	Weather seems warmer but not unpleasant.
XV September 25..	79°	68°	60°	53	766	2000	775	....	Considerable.	One hour bicycle ride.	Weather warm and sultry.
				Average		2140	1404				

TABLE III.

Observations on Different Individuals in Galveston, September, 1903.

	I.		II.		III.		IV.	
	Urine in c.c.	Drink in c.c.	Urine in c.c.	Drink in c.c.	Urine in c.c.	Drink in c.c.	Urine in c.c.	Drink in c.c.
September 15 to 16.....	950	3150	1300	2375	475	2550	....	....
September 16 to 17.....	900	2450	1350	1750	500	1215	1025	2250
September 17 to 18.....	1275	2225	1375	2100	875	1925	560	1650
September 18 to 19.....	1150	1800	1200	1975	925	1875	830	1600
September 19 to 20.....	1300	3050	2375	1875	705	1775	1100	1650
September 20 to 21.....	950	2760	1325	1875	815	1950	900	1600
September 21 to 22.....	930	3150	1150	2500	615	2725	750	1950
September 22 to 23.....	1175	2850	700	2700	650	1900	1375	1600
September 23 to 24.....	1150	3000	700	1400	...	2200	800	2150
September 24 to 25.....	1050	2150	975	1900	725	1775	750	1750
September 25 to 26.....	875	2150	....	....	675	1875	....	....
Average.....	1064	2616	1245	2045	696	1956	899	1800

the mean temperature of these two cities. The chief difference is in the relative humidity and this is most marked at noon and in the evening. There is also a much greater difference between the maximum and the minimum temperatures in San Antonio than in Galveston.

As in the first series no effort was made to use a uniform diet or to take fluid at regular intervals, but the natural inclinations were followed and all fluid taken as drink was recorded. As the object of the observations was unknown to the physicians and pharmacists who kindly assisted me in making these observations, it can be said that the results were not affected in any way by any mental influence.

The subjoined tables show the climatic conditions and the amount of water consumed as drink and eliminated in the urine. The urine was collected for the day (7 A.M. to 7 P.M.) and night (7 P.M. to 7 A.M.) separately, and the specific gravity of the urine was the same for these two periods. It is evident that the excessive amount of water consumed during the day is given off by the skin.

A comparison of the average for seven days (September 15 to 21) shows that the average daily amount of fluid consumed in San Antonio was 1,734 c.c., and the average amount of urine given off was 1,218 c.c. The averages in Galveston for the same period were 2,126 c.c. of water as drink, and 1,016 c.c. of urine. The observations were continued for eleven days in Galveston, and an average for this period gives 2.140 c.c. of drink and 976 c.c. of urine.

These results show that the average daily amount of fluid consumed in Galveston was approximately 400 c.c. greater than that taken in San Antonio, while the quantity of urine was approximately 200 c.c. or 240 c.c. less. The use of coffee did not cause this difference, for more fic gravity taken in each case, but these details do not bear upon the results. The amount of urine passed during the day as compared with the amount passed during the night varies with different individuals but on the average the former only exceeded the latter by 30 c.c., notwithstanding the fact that the amount of water consumed during the day was from two to ten times greater than the amount of fluid taken as drink during the night period. On the average the coffee was consumed by those in Galveston than by those in San Antonio. The average daily amount of coffee consumed was as follows: In Galveston, I, 320 c.c.; II, 310 c.c.; III, 380 c.c.; IV, 150 c.c. In San Antonio, A, none; B, 380 c.c.; C, 200 c.c. If the diuretic action of the coffee vitiated the results at all it was by giving too high an average for the daily amount of urine in the Galveston series.

These results confirm the first series of obser-

TABLE IV.

Observation in San Antonio, Texas. September 15 to 22, 1903.

	A		B		C	
	Urine in c.c.	Drink in c.c.	Urine in c.c.	Drink in c.c.	Urine in c.c.	Drink in c.c.
September 15 to 16	1900	2500	1250	2295	1225	2225
September 16 to 17	1450	1400	1400	1650	1535	1050
September 17 to 18	1450	1300	1300	1500	815	1925
September 18 to 19	1400	1675	900	1900	900*	650*
September 19 to 20	1400	1675	800	1100	400*	625*
September 20 to 21	1100	1600	1100	2150	700*	1825*
September 21 to 22	1000	1200	800	2350	425*	1885*
Average	1385	1621	1078	1849	1191	1733

*Sick with dengue; took purgatives; watery stools.

Average for first three days.

TABLE V.

	Temperature.						Humidity.					
	San Antonio.			Galveston.			San Antonio.			Galveston.		
	Max.	Min.	Mean.	Max.	Min.	Mean.	7 A.M.	12 Noon.	7 P.M.	7 A.M.	12 Noon.	7 P.M.
September 15	92	72	82	88	81	84	..	..	..	77	..	76
September 16	79	59	69	87	67	77	88	71	78	89	..	98
September 17	77	56	66	75	60	68	60	38	30	90	..	39
September 18	80	50	65	73	65	69	66	27	34	67	52	49
September 19	82	56	69	77	68	72	81	52	50	59	54	51
September 20	84	60	72	78	71	74	89	54	48	54	60	61
September 21	86	61	74	80	69	74	89	54	50	85	54	64
September 22	86	65	76	82	72	77	91	50	46	86	55	57
September 23	89	61	75	85	72	78	..	..	..	78	46	43
September 24	90	66	78	82	72	77	..	..	..	65	44	57
September 25	..	..	..	82	71	76	..	..	..	81	64	59
September 26	..	..	..	85	78	82	..	..	..	63	59	70

vations, and seem to justify *the conclusion that one takes more fluid as drink in a moist climate and passes less urine than in a dry climate.* Probably the amount of moisture given off by the skin and the lungs in dry climates is not so great as is often thought. The sensible perspiration which results from the effort at heat regulation on the part of the animal economy in a hot, moist climate, probably accounts for this difference.

TABLE VI.

Summary.	Drink.	Urine.
Average for six days in Colorado in July, 1899	1341	1404
Average for nine days in Galveston in September, 1899	2139	1404
Averages in San Antonio:		
A—Seven days, September 15 to 21, 1903, inclusive	1621	1385
B—Seven days, September 15 to 21, 1903, inclusive	1849	1078
C—Three days, September 15 to 18, 1903, inclusive	1733	1191
Mean Average	1734	1218
Average in Galveston:		
I—Average for eleven days, September 15 to 26, 1903, inclusive	2316	1064
II—Average for eleven days, September 15 to 26, 1903, inclusive	2045	1245
III—Average for eleven days, September 15 to 26, 1903, inclusive	1956	696
IV—Average for eleven days, September 15 to 26, 1903, inclusive	1800	899
Mean average	2104	976
Average for seven days, September 15 to 22, 1903, inclusive, in Galveston.		
I	2655	1065
II	2064	1439
III	2002	701
IV	1783	861
Mean average for seven days during which observations were going on in San Antonio	2126	1016

The important question now arises, Has this anything to do with the causation of Bright's disease? This question cannot be answered by general impressions, or by comparing small numbers. Below will be found a comparison of the mortality records of different cities for the year 1900, taken from the United States Census Report, and of the climatic conditions, taken from the reports of the United States Weather Bureau. The percentage of relative humidity for the summer months is the average for the years 1900, 1901 and 1902. The temperature is the "normal temperature" for these cities and represents the average for about twenty years. The humidity of Galveston and San Antonio is also the average for sixteen or more years.

In the case of Galveston the total number of deaths from all causes and the proportion of deaths from Bright's disease are taken for a period of three years (1901 to 1903 inclusive), as this gives a longer period of time and a safer number for making comparisons. It is impossible to determine from the records of the Health Office the proportion of acute to chronic Bright's disease, or the proportion of parenchymatous and interstitial forms of the disease. The cause of death is often reported as "Bright's disease" or "uremia." The records of the John Sealy Hospital of this city, do not show an unusual proportion of acute Bright's disease, and the numbers of chronic parenchymatous and chronic interstitial forms, vary for different years, but do not appear to differ from those reported from other hospitals. It is the opinion of medical practitioners in Galveston that the disease is generally chronic, and seems to attack young people (under twenty or thirty years) with unusual frequency. In such cases it is usually

TABLE VII.

Comparison of Mortality Rates and Climatic Conditions of Different Cities.

City.	Total number of deaths from all causes.	Number of deaths from Bright's disease.	Annual mortality rate per 1,000 of population.	Percentage of deaths due to Bright's disease.	MAY.		JUNE.		JULY.		AUGUST.		SEPTEMBER.	
					Mean humidity.	Mean temperature.	Mean humidity.	Mean temperature.	Mean humidity.	Mean temperature.	Mean humidity.	Mean temperature.	Mean humidity.	Mean temperature.
Denver	2,484	94	18.6	3.8	56	56°	52	66°	48	72°	49	70°	50	62°
Boston	11,277	371	20.1	3.2	70	56°	68	66°	72	71°	76	69°	79	62°
Atlanta	2,387	81	26.6	3.4	62	69°	67	76°	73	78°	75	77°	75	72°
Indianapolis	2,817	87	16.7	3.1	65	63°	69	70°	62	76°	65	74°	68	66°
Kansas City	2,852	86	17.4	3.0	66	64°	65	73°	63	78°	66	76°	69	68°
St. Paul	1,574	91	9.7	5.7	61	57°	63	68°	68	72°	69	69°	73	61°
Minneapolis	2,183	102	10.8	4.6										
St. Louis	10,320	524	17.9	5.08	69	66°	67	75°	64	79°	67	77°	71	69°
Baltimore	10,679	659	21.0	6.1	67	64°	69	74°	71	77°	73	75°	80	68°
Philadelphia	27,452	1322	21.2	4.8	66	62°	66	72°	70	76°	72	74°	75	67°
New York	70,229	5118	20.4	7.28	67	60°	69	69°	73	74°	74	72°	75	66°
New Orleans	8,287	496	28.9	5.9	74	75°	75	80°	79	82°	80	82°	79	78°
San Francisco	7,040	368	20.5	5.2	82	57°	83	58°	85	58°	87	59°	79	60°
San Antonio	1,294*	34	23.6	2.6	70	75°	68	81°	67	83°	68	83°	69	78°
Galveston (three years)	1,871	191	15.7	10.2	80	76°	80	82°	78	84°	79	83°	78	79°

* Total number of deaths was 1441, but 147 deaths were due to tuberculosis in non-residents and these were deducted.

parenchymatous degeneration primarily, with secondary interstitial changes, and often there are also late arterial changes. When the disease occurs in middle or advanced life, the interstitial form seems to be more frequent, and there is pronounced arteriosclerosis.

A careful study of the table, shows that there is no relation between the degree of humidity or length of the warm summer season, and the mortality from Bright's disease; nor does the latter bear any relation to the general mortality rate. For instance, in Denver and Boston, the conditions of temperature are very similar while there is a wide difference in the humidity, but the proportion of deaths from Bright's disease is practically the same. There is considerable difference between the relative humidity in Galveston and in San Antonio, and also in the proportion of deaths from Bright's disease, but, on the other hand, the mean humidity and temperature are very similar in New Orleans and Galveston, while the death rate from Bright's disease in the latter city is nearly double that of the former. Indeed, the mortality rate from Bright's disease in New Orleans does not differ from that in New York, Philadelphia, Baltimore, St. Louis, St. Paul and Minneapolis, although the climatic conditions are very different.

Doubtless there are errors of diagnosis in many obscure cases, and often the existence of Bright's disease is unrecognized, but these conditions exist in all communities and a comparison of statistics is the only means that we have of determining the unusual prevalence of a disease in any locality. There appears to be no doubt that Bright's disease is more prevalent in Galveston than in most cities, but it seems highly improbable that the climatic conditions have anything to do with this. Galveston is an exceptionally healthful place, and the general mortality rate is low (15.7). The high general mortality rate in Atlanta and in New Orleans is doubtless due to the large colored population. Notwithstanding a considerable colored population, the mortality rate of Galveston is low, and it will be observed that there is no relation between the general mortality rate and that from Bright's disease in any of these cities.

It has been suggested by some that the use of hard artesian-well water might have some causal relation, but this seems improbable, as other cities have a public water supply from the same source, and no such result is observed. To the writer there are two causes which seem more plausible than any of the explanations usually given: (1) The excessive use of meats in a climate in which proteids cannot be so readily metabolized as in a colder climate; and (2) the failure to recognize and properly manage acute infections. Scarlet fever is very often so mild that it is unrecognized and never treated. All the diseases of childhood are unusually light in Galveston. This is probably due to the higher resistive powers which result from the outdoor life at all seasons in a mild climate and on the seashore. Doubtless dengue and influenza, like scarlet fever and diphtheria, can leave a dormant lesion of the kidneys which gradually develops into a chronic nephritis, even though the acute symptoms from the original disease may not have been severe. This would appear to be a very important matter, and too much care cannot be exercised in attending to the after-effects of light attacks of acute infections.

INFANT FEEDING AND MILK MODIFICATION.[1]

BY RANSFORD E. VAN GIESON, M.D.,
OF BROOKLYN, NEW YORK.

IN opening this discussion, my special object will be not the construction of formulas, but the study of principles upon which formulas should be founded. I desire to direct your attention to the composition of human and cow's milk, to the remarkable differences that exist between their proteid contents and how best to adapt the foreign element of cow casein to the digestive power of the infant stomach. Also to justify the use of cereal decoctions and high dilutions, as well as the use of cane sugar instead of cow lactose.

I select two definitions of the fluid called *milk* as best suited to our present purpose—one from the standpoint of the trained and expert chemist and another from a practical clinician, who is also a respected authority on milk analysis.

Dr. Bartley, in the fifth edition of his "Medical Chemistry," 1903, defines milk as an "opaque white fluid containing fat globules in suspension, albumin, sugar and salts in solution, and caseinogen in partial solution." Dr. Arthur V. Meigs, in the *Archives of Pediatrics*, October, 1902, says: "Milk consists of water, salts, fat, sugar and *something else*. That something else we have chosen to call casein, but what it really is, none of us need pretend to understand. Milk analysis helps us to know how to prepare food for babies, but the chemistry of casein is still in its infancy."

The composition of human milk in the living gland of the mother is never constant. There are subtle combinations effected therein which will always elude and baffle the most elaborate chemical research. Hence we find marked variations in the analyses given by different authorities, but by making a general average for each period of lactation we obtain results accurate enough to form a working basis for the modification of cow's milk to the purposes of infant feeding. In so doing we must not be misled into the belief that we should "imitate maternal milk." That is a simple impossibility, as none of the constituents of animal milk are chemically or physically identical with those of human milk, except the water and inorganic salts. Were it otherwise the cow could be led into the nursery, and the problem would be

[1] Read before the Medical Association of the Greater City of New York, June 13, 1904.

solved, and this discussion would be an entirely superfluous symposium.

Hoffman, in 1894, concludes that after the third week of lactation human milk varies but little. He gives the following average: Proteids, 1.03 per cent.; fat, 4.07 per cent.; sugar, 7.03 per cent.; ash, 0.21 per cent.

Judson and Gittings say: "The results of all analyses show that the proteid per cent. is very high in the first weeks after birth, diminishing after the thirtieth day. From the sixtieth day there is a decided and rapid fall. After the seventieth day the composition of the milk remains quite uniform. The fat is a varying constituent, ranging from 2½ to $4^1/_5$ per cent. It differs materially from cow fat, being much more easily digested."

There does not seem to be any constant or fixed relation between the proteids and fat. There is always an excess beyond the apparent needs of the child. The sugar content ranges from five per cent. in the first month to seven per cent. during the remainder of lactation. The specific gravity of human milk will range from 1.029 to 1.032. It affords no certain guide to the quality of the milk, unless either the total solids or fat is known. In modifying cow's milk, the familiar rule to decrease the proteids and raise the sugar to the average proportions of the same in human milk is not always to be strictly observed. While we depend much upon comparative analysis of the two fluids, we must ever bear in mind that their most essential ingredients are not identical, nor must we ignore the vast clinical experience in this direction which established infant feeding on a safe and successful basis, long before milk analysis had reached its present accuracy. The essential knowledge which will guide us through the maze of conflicting theories and formulas is a thorough and familiar understanding of the great difference between human and cow casein.

The chief characteristic of cow casein is its ready coagulation into large indigestible masses, rich in fat. While human casein coagulates into fine, soft flocculi containing much less fat, easily acted upon by the gastric juice. If we examine the contents of a nursing infant's stomach one-half hour after a moderate meal, we find the chyme almost completely fluid and susceptible of filtration. The stomach contents of a child after a meal of cow's milk, at the end of three-quarters of an hour show casein clots still undigested. It is prudent and safe to look upon cow casein as admirably adapted to the purpose for which it was intended—the nourishment and development of the calf; but for the human species we may, with profit to the little ones intrusted to our care, regard it as a *foreign body*, capable also of sustaining infant life, after it is *adapted* to a stomach of feeble power, by nature designed for an easily digested food. Again, woman's milk, after coagulation, is thin, almost liquid. It does not require active peristaltic action to revolve its particles so as to become normally digested. It passes readily down from the nearly straight stomach into the intestines to be farther acted upon by their juices. With cow's milk the peristaltic action, normally weak, fails to soften the tougher clot, which very slowly finds its way from the stomach to the intestines, where portions still undigested are likely to prove sources of irritation.

The practical clinical fact here obvious is the important one that the digestive organs of young animals are adapted by nature to their normal food, and, as we cannot alter the organs, we must, in changing from the calf to the infant, modify the food to the organs. To do this we must so envelop, surround and come between the particles of cow casein not only by dilution, but also by the use of some viscid material, so that they shall not cohere in tough and indigestible masses.

We need also to expose a large surface of this foreign casein in a finely divided form and in *smaller quantities* than the *average amount* of *human casein* to the digestive action and feeble peristaltic motion of the infant stomach.

Dilutions of cow's milk have been made upon the assumption that because woman's milk contained 1½ per cent. casein, therefore we should make the mixture contain the same amount of cow casein. This error arises from following too closely laboratory inferences. Somewhat slowly this error has been corrected, and we now observe that the best authorities begin with high dilutions. For the first month with only one-half of one per cent. of proteids and 2½ per cent. of fat, and gradually reach one per cent proteids at the end of the month.

During the first month of normal lactation, the amount of human proteids may rise as high as $2^9/_{10}$ per cent.; and some writers, disregarding and rejecting all clinical experience, have recommended undiluted milk for young infants because the caloric value of woman's milk is almost identical with that of cow's milk. Schlesinger, of Breslau (*Berliner klinische Wochenschrift*, No. 7, 1901), assumes the responsibility for this teaching, and advises small quantities of whole milk during the first month. Where the proteids are diluted to one-half per cent. with two per cent. of fat, we get excellent results for the first two weeks, all theory to the contrary.

Dilutions of milk make it necessary to add some form of sugar to bring the total amount in the mixture to 5 or 6½ per cent. Here, as in almost everything else connected with infant feeding, there has been considerable dispute. Personally I have always used pure granulated white cane sugar. I am not prepared as yet to believe that cow lactose and human lactose are identical in composition or effect. It is contended vaguely and without sufficient proof that it is more liable to set up fermentative changes. It is also frankly admitted that it is often better borne than cow lactose. After using it for

many years I have found no reason to change my views as to its superiority over cow lactose. Pure levulose, being a very easily assimilated fruit sugar, promises to give satisfactory results. Its expense at the present time would prevent its general use.

In considering the farther modification of cow casein beyond that of simple dilution, we find that for many years some form of cereal decoction has been empirically and successfully used in small quantities. As no starch is found in the milk of women or the lower animals, it has been objected to as unfit for milk modification, but clinical experience and more recent investigations prove incontestably that when used in proper quantities it is one of the most valuable means we possess for milk dilutions. Dr. Shaw (*Albany Medical Annals*, 1904) details a series of interesting experiments in connection with this point which are instructive and convincing, proving that starch in one-half per cent. solution is converted into erythrodextrin and maltose in the stomachs of young infants. He arrives at the following conclusions: "That the saliva of young infants contains a diastatic enzyme capable of converting small amounts of starch into maltose; that the diastatic action of the saliva may continue in the stomach as long as two hours after feeding; that on physiological grounds there is no reason why young infants cannot digest small quantities of starch."

The experiments were made on thirty-five infants, the youngest being six days old. Control tests of the starch solution were always made.

It has been taught that the attenuation of cow casein depends upon the degree of dilution, irrespective of the presence of starch. To determine this point, at the suggestion of Dr. T. M. Rotch, of Boston, the question was studied by Dr. F. W. White (*Boston Journal Medical Sciences*, December, 1900). The experiments justify the following conclusions: (1) "Dilution of milk with cereal decoctions of proper strength render the casein curd much more fine, soft and digestible than dilution with water; (2) "The above property is due mainly, if not wholly, to the starch in solution. The most desirable amount of starch in the milk mixture for practical use is approximately three-fourths per cent.; (3) "Diastase, by converting the starch to dextrine and maltose, promptly lessens and removes the action of cereal waters upon casein. Its addition, therefore, is not a practical measure when the action upon the curd is desired; (4)"Albumin water has no practical value as a diluent of milk; (5) "Lime water added to milk has no more effect than water upon the character of the curd produced in the animal stomach."

It was also found that this mixture, after pasteurization at 167° F. for thirty minutes did not interfere with the action of the starch, but rather improved it, the curd being somewhat finer after being heated.

The fat of cow's milk gives comparatively little difficulty. It should always be taken from fresh gravity cream. Centrifugal cream is still *sub judice*, and until we know more about it, it will be safe to take advantage of the top milk mixtures. The tables of Chapin and Holt are valuable and sufficiently accurate for home modification. Laboratory or prescription milk recombines the milk elements in any desired proportion after they have been separated by centrifugation. From purely theoretical inferences it would seem to be correct in principle, but clinical experience, according to Dr. Starr, does not bear out the theory. The natural fat emulsion is destroyed by the use of the separator, and in some way the digestibility of the proteids is diminished.

Milk may be farther modified by peptonization, whereby the curd is softened and partially converted into albuminose by pancreatin and bicarbonate of soda. This method is especially useful where digestion is weak and sufficient proteids cannot be assimilated. Where the digestion is normal it is not necessary.

Modification by pasteurization and sterilization may be considered as necessary evils, to be used when indicated and discontinued when the necessity is past. Of the two evils, pasteurization at 155° F. for thirty minutes is decidedly the lesser. Dr. Freeman (*Archives of Pediatrics*, Vol. XIV) reports that one million bottles thus prepared were distributed among the poor of New York. During the three years of its use the number of deaths from diarrheal diseases were less by 860 than in the three preceding years.

What we have already said applies to pure cow's milk and cream as the basis for modification, but for many years condensed milk has been very popular among all classes as an infant food. As an exclusive food it cannot be recommended, as it is usually used, especially among the poor, by simple dilution with boiled water. Children seem to thrive upon it, for a time at least, in spite of the very low fat percentage, but sooner or later the signs of malnutrition become apparent in the form of rachitis, scurvy or anemia. When properly diluted and fortified with cream, barley and lime water, five per cent., it can be continued for a long time without injurious effects. But where cream can be obtained good milk can also be obtained, and there is no reason in such a case for using it.

In conclusion, we cannot fail to observe that it is possible to feed infants by a variety of methods, founded on different theories, and have them gain in weight and vigor. It must be obvious that in all these methods some central fact or facts predominate and harmonize the difference in methods. It would seem, in reviewing those that are most successful, that the two chief factors are purity of the milk and the proper adaptation of the cow proteids to the capacity and power of the infant's digestive organs.

In this brief summary of our subject, my endeavor has been to make these facts the predominating feature. How best to modify and adapt the foreign elements of cow's milk for infants was long ago discovered by our fathers in pediatrics. Modern research has proven that they were correct in principle and practice. The findings of the observant clinician at the bedside usually precede those of the chemist in the laboratory. Mere chemical analysis is not always to be regarded as a true criterion of the value of food. The digestibility of the food represents its true value, and in infant feeding is the all-important question.

CICATRIZATION—BLOOD VESSELS IN ULCERS OF THE BLADDER.[1]

BY GUSTAV KOLISCHER, M.D.,
OF CHICAGO, ILL.

SINCE I have called attention to the fact that ulcers of the bladder are of a rather frequent occurrence in cases of chronic cystitis, and run a well-defined and typical course, this condition was rather uniformly recognized by the urologists and the treatment suggested and successfully employed by me was taken up by all genito-urinary men familiar with cystoscopy and endovesical work. I again wish to mention that this treatment consists in curetting the ulcers and cauterizing their bottom by means of silver nitrate in substance, or by employing the galvano-cautery. All this is done through an operative cystoscope.

This energetic and radical proceeding becomes necessary because these ulcers are the product of foci of dense infiltration, and because the bottom of these ulcers is covered with a thick coating which adheres quite strongly to it, so that even a concentrated solution of some caustic will never be able to reach the granulations in order to prove the desired reaction, if the coating was not previously removed. It is true that the above-mentioned treatment will always be a complete success so far as the disappearance of the ulcers is concerned. But in some cases, although the ulcer has disappeared, certain annoying symptoms will remain. This is especially true in cases in which the ulcers are not the consequence of a chronic cystitis, but are due to lesions of the mucosa inflicted upon an otherwise healthy lining of the viscus. These losses of substance are infected either at the time when the lesion was inflicted or the infection occurs later on. In this way, the epithelialization of the defects is prevented, and one or several ulcers are established.

These ulcerations have a decidedly different appearance from ulcerations due to chronic cystitis. The latter appear always on the summit of a little elevation, and show extensive surrounding infiltration because they are the result of a suppurative softening of a focus of inflammatory infiltration. The former are sunken in the mucosa, so that their bottom lies underneath the level of the bladder mucosa. Extensive surrounding infiltration is only exceptional, and very rare. We also, as a rule, miss the thick and miscolored coating which covers the bottom of cystitic ulcers so that in this variety the irregular granulations of the ulcer lie bare.

These ulcerations are of a traumatic origin, as a rule, due to instrumentation. The use of catheters with a raw surface, injudicious sounding or the producing of burns through a cystoscopic lamp, are the most frequent causes. In some cases, these traumatic ulcerations are the result of lesions inflicted by extraneous bodies introduced into the bladder by the patients themselves. In some cases the removal of the guilty foreign bodies and antiseptic flushings and instillations will suffice to bring about the clearing up of these traumatic ulcerations, and in the further decourse, accomplish the epithelialization of the defects. In stubborn cases, however, we have to again resort to curetting and cauterizing.

In four of my cases of this category I made the rather surprising observation that disagreeable symptoms, such as irritation in the bladder region, frequency of urination and occasional tenesmus persisted, although the urine was cleared up perfectly and repeated and careful systoscopic examinations proved with absolute certainly that the ulcers had healed up and complete epithelialization of the defects had taken place.

There is only one theory I have to offer for explaining this occurrence, and the results following the therapy employed seems to bear me out in my statements.

I noticed in most of my cases of traumatic ulcers that when the ulcer began to heal, quite large blood vessels loomed up in its neighborhood, and led to the circumference of the ulcer. It impressed me that these blood vessels might be something similar to the cicatrization loops which appear running to the ulcers in the cornea of the eye, and I actually do not know of any better comparison for this condition. These blood vessels appear in the number of two or three or four, and in approaching the circumference of the ulcer they show a meandering course; the loops lie very close to each other, giving the appearance of the diagram of a micrometer screw. It occurred to me that the persisting of these blood vessels might have something to do with the sensation of irritation of which the patients continued to complain, even after the ulcers had healed. I remembered the explanation that Hebra gave for the itching which carriers of varicose veins on the legs experience.

He claimed that the itching was due to the sensation produced by the very slow and torpid flow of the blood, in dilated and meandering blood vessels.

We observe similar sensation of itching, heaviness and frequency of urinary cells in cases of so-called bladder hemorrhoids.

[1] Read before the February, 1904 meeting, of the Chicago Urological Society.

I obliterated these blood vessels with the pointed galvanocautery of my operative cystoscope, and after the eschar was thrown off, which, as a rule, takes about a week, the symptoms had entirely disappeared and the patients remained well.

TUBERCULOSIS IN OUR PUBLIC INSTITUTIONS.

BY JAMES GREENWOOD, M.D.,
OF SAN ANTONIO, TEXAS;
SECOND ASSISTANT SUPERINTENDENT, SOUTHWESTERN INSANE ASYLUM.

TUBERCULOSIS is by far the most serious disease we have in an asylum, because its course is usually so rapid, there are always so many patients with lowered vitality in danger of becoming infected, and especially, since so little can be done to prevent expectoration of sputum laden with tubercle bacilli on clothes, bed, floor, walls, and everything around.

In all situations where people are confined, either by occupation, religious orders, poverty, or the requirements of law, as in asylums or prisons, tuberculosis is a serious problem with which to deal. Under these conditions we have lowered vitality from lack of fresh air, poor food, exposure and disease on one hand, and on the other, intimate contact of those already affected with tuberculosis, with the serious difficulty of taking proper precautions in the destruction of their infected sputum.

In an insane asylum a large percentage of our cases are demented, having little physical or nervous constitution, and are in constant danger of any infection, such as tuberculosis, pneumonia, or gastro-intestinal intoxication.

The acute cases are likewise in a state of lowered vitality, and present conditions favorable to infection with tubercle bacilli. These patients are in close contact with those already infected whose expectorating on everything around them is almost impossible to prevent. This sputum, laden with tubercle bacilli, dries, becomes dust, blows about here and there, the wards become infected and everything producing dust, as sweeping or dusting stirs them up for all to breathe,—so that patients, attendants and doctors are in constant danger of contracting the disease.

The tuberculosis record at the Southwestern Insane Asylum is as follows: During the twelve years of its existence there have been 392 deaths, of which 85, or 21⅔ per cent., were due to tuberculosis. Nine-tenths of our patients are between twenty and fifty-five years of age. Eleven-twelfths of our deaths from tuberculosis were at this age. The total death-rate per 1,000 living in the United States for this age is about ten, of which 4.4 to 4.8 is due to tuberculosis. In the asylum for twelve years we have had an average yearly death rate per thousand, treated for this age, due to tuberculosis alone, of 13. This is more than from all other diseases on the outside, and three times as many as are caused from tuberculosis alone in the United States for this age.

During the first three years there were no deaths from tuberculosis, but as the wards became infected, the death rate from tuberculosis has increased, until it has averaged 18 per 1,000 treated, for the last five years.

Table No. 1 gives the number of deaths each year, the number of these due to tuberculosis, the number treated, the percentage of death due to tuberculosis and the rate per 1,000 treated due to it. The average length of time in the asylum of those dying with tuberculosis has been 3½ years. Thirty-eight, or over one-half, were here from one to four years. Sixteen had been here under one year, and 24 for five years or over.

Table 1.

Year to Sept. 1.	Total Deaths	Deaths due to Tuberculosis.	Average Daily No. of Patients.	No. Treated for Year.	Per Cent. due to Tbc.	Per 1000 Treated.
1892	1	0	..	..	0	0
1893	9	0	177	234	0	0
1894	15	0	235	294	0	0
1895	15	4	238	338	25	11.8
1896	15	4	271	361	25.1	11.1
1897	9	1	274	347	11	3
1898	18	3	274	331	16	9
1899	20	4	474	512	20	7.8
1900	89	13	704	894	15	14.5
1901	47	10	761	852	21	12
1902	67	17	745	915	25	18
1903	52	18	770	916 for ½ Yr	35	19
6 m. to Mar. 1, 1904	28	11	770	920 for 1 Yr 460	40	25
Totals	392	85		6474		

Table 2.—Time in Asylum Before Death.

Few hours	1
1 month	2
2 months	2
3 months	4
4 months	4
6 months	1
9 months	2
1 year	6
2 years	12
3 years	10
4 years	10
5 years	4
6 years	3
7 years	1

Table No. 2 gives the duration of their confinement in this asylum. In the last twelve months on the female side, we have had 29 deaths, of which nine, or 30 per cent., were due to tuberculosis. This is 19 per 1,000 treated. Of these nine, three died on Ward C, and three more were sent from this ward to the hospital after the disease was contracted. Six of these nine cases therefore contracted the disease on this

Table 3.—Number of Deaths from Tuberculosis in Twelve Years.

Age, 15 to 20 years	3
" 20 to 25 "	12
" 25 to 35 "	24
" 35 to 40 "	20
" 45 to 55 "	12
" 55 to 65 "	4
Over 65 years	1
Total	76

ward. This is the ward where our most demented cases are kept, and presents the most favorable conditions for contracting tuberculosis on account of the physical condition of the patients, and the difficulties of preventing those already affected, from infecting the ward.

Of these nine cases, eight were dementia, two being epileptic dementia; and this shows the influnce of the lowered vitality in predisposing to contracting the disease.

On the male side we have had during the last twelve months, 28 deaths, of which eight were due to tuberculosis. Four contracted the disease on Ward No. 7, a ward very similar to C, in the character of its patients, and the other four on Ward 4, where about nine-tenths of the cases are dementia. Of these cases eight were dementia.

At present we have six known cases of tuberculosis, all females, and all are at the hospital. Of these six cases, four contracted the disease on Ward C, the same infected ward that has been responsible for so many cases. We have a few suspicious cases besides, where examination of sputum and physical signs are negative, yet a slight cough, some loss of weight, an evening rise of temperature, make us suspect them of having the disease.

Our methods of prevention are as follows: All cases are sent to the hospital as soon as diagnosis. Some few patients are too noisy and violent, and have to be kept on the wards; these are sent to Ward C. At the hospital, when possible, patients are made to use spittoons, in which five per cent. chloride of lime is kept. Clothing on which they have expectorated is removed at once. All clothing, sheets, etc., of these patients is put in separate bundles, sent to the laundry with directions to be boiled before opened. All these patients use separate cups and glasses. Mattresses are disinfected by exposure to two per cent. formaldehyde gas for eight hours in a sealed room. The floor is washed with chloride of lime solution, instead of sweeping.

We have had no known cases of tuberculosis to develop at the hospital during the last year; so, considering the number of tuberculous cases present, and the difficulties in attending them, our methods have been very successful.

In Ward C we have made some radical changes. Any room in which a tuberculous patient has been sleeping is disinfected. The clothes are sent to the laundry to be boiled; the mattress disinfected by exposure to formaldehyde in a sealed room, the room, floor, walls and bedstead are washed with five per cent. carbolic solution. All the mattresses and blankets, pictures, etc., in this ward have been exposed for six hours to formaldehyde gas. The walls and floors are washed with five per cent. carbolic solution. There are no rugs, carpets or curtains to collect dust. The ward is swept with wet sawdust sprinkled over the floor beforehand. Often the floor is scrubbed with chloride of lime or five per cent. carbolic instead of sweeping. All mucopurulent expectoration is watched for, examined for bacilli and the patient examined so as to be isolated at the earliest possible moment. During the day this ward is kept almost free from patients. They are usually at the park, but when they come back, they go out on a long gallery.

What we most need is a special hospital for tuberculous cases, so built that they are given plenty of fresh air, yet easily disinfected. Another important preventive measure would be the enactment of a law requiring all cases admitted to be free from tuberculosis, as it is for other contagious diseases—smallpox, for example.

At present we have a law that no patient laboring under an infectious or contagious disease shall be admitted to an asylum. Tuberculosis should be included in this classification, and no known case should be admitted until a separate hospital is provided, where they can receive proper attention, and yet not endanger the lives of others.

COLLOIDS AND IONS.

BY WILLIAM R. WILLIAMS, M.D.,
OF NEW YORK.

THIS paper aims to present a few of those results of some of the more recent work of physiologists which bring us a little nearer to the secrets of vital processes. While this line of investigation has not as yet had much effect upon our immediate work as physicians, there is reason to believe that in time it will greatly advance our knowledge of physiology and pathology, and that therapeutics also will therefore gain by it.

Perhaps it may be well to begin with a review of some of the better known points. Much of the work has to do with electrolytes and ions. An electrolyte is a substance which, when melted or in solution conducts electricity. The actual passage of the current through such a solution is associated with certain changes called electrolysis. The molecule is found to be dissociated into two or more electrically charged particles called ions. Some of these ions are charged positively, and tend to migrate to the negative pole, the cathode; they are called cathions. Others have a negative charge and go to the anode; they are anions. For example, sodium chloride is an electrolyte, it is dissociated into two ions. Na is the cathion and goes to the cathode, Cl is the anion and goes to the anode. Sulphuric acid splits into three anions, two cathions, H and H, each with a positive charge, and one anion, SO_4, which has a double negative charge. In solutions of electrolytes a greater or less number of ions exist in a free state, even when not in an electric circuit, and move in all directions in that liquid.

When, however, an electric current is passed through the liquid, the ions assume a definite position relative to the current and tend to accumulate at one or other electrode. When the

ions reach the oppositely charged electrode, they part with their charges and become inert. Faraday said that the passage of electricity though solutions of electrolytes is possible only through the migration of these charged particles. Primarily, however, the dissociation is not affected by the current, but by the act of solution. H_2SO_4 is an electrolyte, but an attempt to pass a current through pure 100 per cent. sulphuric acid is unsuccessful. It is a non-conductor, it is not dissociated into ions. If a little water is added some of the molecules are dissociated into ions, and the liquid now conducts the current.

The ability of a solvent to dissociate the molecules is called its dissociating power. This varies greatly with different solvents. Water or possibly hydrogen peroxide has the greatest dissociating power, but the alcohols and other liquids possess it to a less degree. With the same solvent the degree of dissociation varies with the temperature, the strength of solution and the particular solid. In very dilute solutions all of the molecules are dissociated. The table shows the degree of dissociation of sodium chloride in water at 18° C. The strength of solution is expressed in gram-molecules per liter. A gram-molecule in a mass of a substance that weighs one gram multiplied by the molecular weight of the substance. This is called a mol, often abbreviated to m. A mol of sodium chloride is 58.5 g.

Dissociation of NaCl in H_2O at 18° C.

M per Liter.	Grams per Liter.	Per Cent. solution.	Degree of Dissociation.
M	58.5	5.85	0.68
$M/_2$	29.2	2.92	0.73
$M/_{10}$	5.85	0.58	0.84
$M/_{100}$	0.58	0.06	0.93
$M/_{1000}$	0.06	0.006	0.98
$M/_{5000}$	0.012	0.0012	0.99
$M/_{10000}$	0.006	0.0006	1.00

From this table it will be seen that the ordinary solutions of this salt are dissociated to a very great degree. The neutral salts of the strong mineral acids have about the same degree of dissociation.

Colloids.—The next subject that I would lay before you is that of colloids.[1] Mixtures of colloids and liquids appear in different physical states. (1) There is the solution, a more or less viscid liquid, called a sol, and when the liquid element is water a hydro-sol. (2) A soft solid, but made up of the solid colloid and of liquid components. This is a gel, and when the liquid component is water a hydrogel. A mixture of gelatin and water of the proper strength, (*e.g.*, ten per cent of gelatin) is liquid, a hydrosol, when hot; if it is cooled to about room temperature, it sets and becomes a hydrogel. If again heated it becomes liquid. By alternately heating and cooling, it may be changed from one state to the other indefinitely. Such a system is called "reversible." All colloids do not act in this way. Thus, if a hydrosol of silica becomes solidified, it cannot again be liquefied. It forms an "insoluble" or "irreversible" gel. It is often possible to change a soluble gel so that it is no longer soluble; thus, formaldehyde acts on a gel of gelatin so that heat no longer liquefies it. (3) There is finally the colloid alone without any admixture of liquid. It is a solid.

The change from the liquid to the solid state, and *vice versa,* depends upon various factors, the temperature, the strength of solution, the presence of other substances, such as mercury bichloride, chromic acid or its salts, osmic acid. formaldehyde or alcohol, or the electric current. Many of the experiments with colloids are very interesting. If white of egg is mixed with nine volumes of pure water, filtered, boiled, and dialyzed against water to remove most of the salts, a blue opalescent solution is formed, which is not coagulated by boiling. The solid constituent is an alkali-albumin-like body. It is present in the water as minute, discrete particles in suspension, and to their effect on light the opalescence and blue color are due. If now, by prolonged dialysis against pure water, more alkali is gotten out, the mixture becomes a gel, and when all of the alkali has been removed, the solid constituent is precipitated in flakes. If a free acid is now allowed to diffuse in, the process is reversed, and a blue solution is again formed, but the solid is now an acid-albumen. The substance is extremely sensitive to the action of acids or alkalis. For instance, if a pin-point is dipped into a strong solution of sodium hydrate, shaken in the air and then washed in 5 cc. of pure water, an alkaline solution is formed that will completely dissolve a considerable amount of the coagulum. In the alkaline solution it is found that the solid constituent has an electric charge that is negative in relation to the solvent. In the acid solution the solid is electro-positive to the solvent. At the point of precipitation it is iso-electric with the solvent. As it approaches the iso-electric point, the solution is exquisitely sensitive to the electric current. A constant current of a millionth ampère passed through the slightly alkaline, opalescent liquid leads to the formation of coagulated flakes at the anode, while the opalescence grows less at the cathode. Again, as the iso-electric point is approached, mere mechanical agitation is enough to precipitate the colloid.

In his book on "Insectivorous Plants" Darwin[2] has recorded some observations that bear upon this work. They have to do with the contraction of the tentacles of the insect-eating leaves of the sun-dew, Drosera. The movements of the processes are very slow. To contract down upon an object needs an hour. This position is maintained for hours, and finally the straightening of the tentacles needs one or more hours. These sluggishly moving tentacles were watched under a microscope while living. When the cells were at rest the protoplasm was perfectly clear. As they contracted under the influence of some stimu-

lus, a change that Darwin called "aggregation" took place. It consisted in the appearance of dark, opaque masses in the protoplasm that slowly but constantly change their form. The process of aggregation could be traced down the tentacle, pausing a while at the cell partitions, until it reached the base of the tentacle and spread to the body of the leaf. It also appeared in other tentacles near those first affected. So long as the contraction lasted the opaque masses were present. As the tentacle relaxed, the masses disappeared and the protoplasm again became perfectly clear. They first disappeared at the bases, and the clarification proceeded toward the apex. In older cells that had been stimulated repeatedly the tips of the tentacles always contained a few masses. In order to show this phenomenon, the cell must be alive and uninjured. Surprisingly delicate stimuli could bring it on. Solutions of various chemicals, mechanical stroking of the leaf, contact with inert foreign bodies, etc., were alike effective. He calculated the amount of ammonium carbonate necessary to cause distinct masses to appear within an hour, and found it to be less that 0.0005 mg. The living protoplasm acted exactly like reversible colloid.

When fixed by death, with or without reagents, protoplasm is still colloidal, but no longer reversible or soluble.[3] When so fixed it has a more or less definite structure. It is important to compare other colloids with protoplasm in this respect also. Many colloids have been used in this research, such as serum albumin, globulin, paraglobulin, the egg-white, and gelatin, separately or taken together. They have been fixed by the various methods used in histological work. In every case the coagulated mass has been found to have a granular or reticular structure, the meshes of which contain the liquid constituent of the sol. The resulting figure of the framework seems to depend upon the concentration of the solution, the fixative, the particular colloid or colloids used, the temperature during and after fixation, and the amount and kind of crystalloids or insoluble bodies present during the process.

If the egg-white solution mentioned previously is coagulated, and very thin sections, about one micron thick, are examined with an oil immersion lens, a fine net is seen and at the intersections are minute spheres, which are connected by fine trabeculæ. The diameter of the mesh varies from less than one micron to several microns, depending upon the factors mentioned above. If electrolytes are present, the mesh is larger, and the coagulation is more easily effected. Although the coagulated mass may have the same volume as the preceding solution, it is now made up of both solid and liquid constituents. This can be shown by purely mechanical methods in the egg-white gel, in gelatin, etc. Perhaps the most familiar example is a blood clot where the insoluble colloid fibrin contracts spontaneously under the ordinary conditions found in a blood clot.

If in the solution of the colloid there are also solid inert particles in suspension, the structure after coagulation is somewhat modified. Very finely divided particles of carmine were mixed with the egg-white solution. In the clot all of the carmine grains were found in the nodal points of the mesh, and the size of the mesh and thickness of the bars were increased near the granules. This closely resembles the structure found in certain secretory cells that contain insoluble secretory granules.

Perhaps the strongest evidence of preexisting structure in protoplasm is the aster figure of dividing cells, or the striations of muscle. It is a question whether these appearances are due to the disposition of different substances which are quite separate or whether a uniform colloidal solution would present similar figures if fixed while under a strain. To test this point films of solutions of the modified egg-white, of soaps and other colloids were stretched across rings of cork. Then a very small drop of mercury was run upon the film. This subjected the film to a definite strain, the lines of force radiating from the mercury. While in this condition the films were fixed. The solid part of the clot had a fibrillar structure, the lines radiating from the center. This would mean that in a collodial solution either a strain produces heterogeneity or structure which is fixed in coagulation, or else that the strain disposes the molecular aggregates of the colloid along the lines of force, although the exact pattern may not be identical before and after fixation. In any case, it does not point to the existence of two kinds of substance such as spongioplasm and hyaloplasm. Furthermore, the colloid thus fixed is doubly refracting, just as striated muscle is.

It is pertinent here to recall that a living worm has been observed in a living muscle fiber. As it crawled along it displaced the bands and rods, but it left no wake, as they immediately fell into position again and the fiber looked exactly as it did before. This is hard to explain if the muscle protoplasm has the kind of structure usually ascribed to it. Hardy, who has done much work on this subject, draws the following conclusions: Structure is produced by sub-mortem or post-mortem changes in the cell, that are associated with coagulation. Coagulation and fixation are alike in being a desolution with formation of irreversible molecular aggregates with liquid in the meshes. The structure may be modified by foreign bodies in the colloid. Secretion masses and the carmine grains are such foreign bodies, but some secretion masses may undergo changes after the death of the cell and so still further change the structure of the colloid. The alveolar cells of the orbital glands of kittens and puppies were fixed in absolute alcohol, and very thin sections were cut and mounted. These preparations showed the secretion granules distinctly, and at the edge of the section, where it was about two microns thick, places were found from which the granules had dropped out. At these points the cell had a honeycomb structure enclosing the

spaces that had been occupied by the granules. There was no evidence of inner structure in the protoplasm itself, and the trabeculæ seemed homogeneous and structureless.

Again, similar cells were mounted in the field of a microscope in such a way that they could be watched while being treated with various liquids. Cells fixed in alcohol were treated with more diluted alcohols. In 60 to 40 per cent. alcohol the cell and the individual granules had swollen to several times their former diameters. The granules had lost their staining properties. Stronger alcohol again contracted the cell and granules to their original size, but the granules did not regain their staining properties, and the final picture gave no clue as to the amount of distortion and change in the processes of fixation and dehydration. It would seem, therefore, that the typical net of secretory cells in these preparations is the optical section of honeycombed protoplasm distended by the secretory granules; that it is not a net within the protoplasm, but a net composed of the whole of the protoplasm.

Fixing the cells in osmic acid fixes the granules perfectly, so that they no longer swell or change in water. Then the net is the conventional net of fixed colloids, with granules at the nodal points, and the meshes of the sponge are simply liquid-holding spaces. Cells from many different tissues and animals were examined in this manner, and in all it was found that the cell protoplasm reacted to osmic acid or bichloride of mercury, just as a soluble colloid does to a reagent that converts into an insoluble colloid. This would indicate that there is no evidence that the structure discoverable in the cell body of these cells after fixation has any counterpart in the living cell, much of it is artefact and very different pictures of the same gland cells are gotten by different reagents.

Living *Paramœcia* and other protozoa[4] illustrate colloidal properties in very interesting ways. They grow more readily in slightly alkaline media. In these cultures the animals had a negative electric charge in relation to the water, they showed negative chemotaxis to weak hydrochloric acid, and when in an electric current they moved toward the anode. Those grown in an acid media had quite opposite affinities. If acid were slowly added to the alkaline culture until the reaction became weakly acid, the organisms in the electric current would slow their progress to the anode, then stop, and finally most of them would move toward the cathode. The electric charge of the colloid in these tests depended upon its environment, its charge being opposite to that of the culture media, as was the cause of the egg-white solution.

Nucleo-proteids[5] have acid characteristics, the degree of acidity depending on the amount of nucleic acid present. This acid is most abundant in the chromatin of dividing cells and the heads of spermatozoa, hence their affinity for basic dyes. The extranuclear proteids are chiefly basic and are stained by acid dyes. There is some evidence to show a corresponding electrical difference between these classes of matter. The chromatin is electro-negative, the cytoplasm electro-positive. The difference of potential is greatest at the time of cell division, and possibly it modifies the figures, which suggest the lines of force in an electric field. If the different parts of cells have these electrical charges, then free cells which are relatively rich in nuclear substance, and to a greater extent free nuclei, should migrate against the electrical current toward the anode; cells that are chiefly cytoplasm should be less negative or even positive.

To test this, isolated cells from various tissues and as fresh as possible were put into $^{n}/_{4}$ cane sugar solution—which is isotonic with physiological salt solution—mounted on a slide and watched while a current of electricity was passed through. The rate of motion was measured by a micrometer. Frog's blood much diluted with the cane sugar solution was examined in this way. Most of the red cells moved slowly, 120 microns a minute, toward the anode, some were stationary, and a few were positive and moved with the current. The small leucocytes were distinctly negative, and went up the field at the rate of 1,500 microns a minute. The medium-sized leucocytes were slightly negative, but a few were neutral or even positive. The large leucocytes were decidedly positive, going down the field 120 microns a minute.

The same results were obtained from minced spleen or thymus. If the current was reversed, all cells stopped and started off in the opposite direction. Sperm heads from the winter frog were strongly negative and raced for the anode at 2,000 microns a minute. The testes of these frogs contain large cells, Sertoli cells, consisting of a round mass of protoplasm with a bunch of spermatoza heads at one pole. Such a cell orientated itself in the current with the sperm heads toward the anode, and sometimes the whole cell would move slowly up the current. A reversal of the current was followed by the slow rotation of the cell until the orientation was again complete, when the cell would again be pulled to the anode with the small end in advance. If an object of this shape were moving freely in a liquid the blunt end would always be in front, and the small end would follow like a rudder. These tests seem to bear out the hypothesis of the electrical charges very well. The cells which had the greater relative amount of chromatic substance were most strongly negative. The Sertoli cell in particular showed the greater negativity of the smaller part, the sperm heads, rich in chromatic substance, and the positive charge of the large mass of the cell protoplasm.

The *effect of ions* on different kinds of protoplasm has been the subject of much study. I will refer to a few of the experiments and their results:

Medusa.[6]—The medusa or jellyfish, so often

seen propelling itself slowly along the surface of the sea, is made up of an umbrella-like gelatinous mass, from the edge of which dangles a fringe of tentacles. Within this bell, corresponding to the handle of the umbrella, are the mouth parts. In sea water the bell contracts rhythmically by virtue of muscle fibers that radiate like umbrella ribs. This contraction forces the animal through the water. If now a cut is made that severs the ring at the edge of the bell from the central portion, this ring will contain practically all of the central nervous system of the animal. If these two parts are put in sea water the ring contracts rhythmically, just as the entire medusa did when intact. The central part, however, lies motionless.

Attempts were made to find the effect of various electrolytes on the central portion. It was put in a 5/8m. solution of pure sodium chloride in water. This solution is about isotonic with sea water. The bell at once began to beat, and the rate increased until it was hardly possible to count the contractions. Another solution was prepared containing about the same amount of sodium chloride and in addition about $^1/_{300}$ m. $CaCl_2$. In this, after a latent period of a few minutes, the bell began to beat, and the contractions were more like those of the normal medusa in sea water. In other solutions, with about $^1/_{28}$ m. $CaCl_2$ or more, the beating was wholly absent. Strontium or magnesium acted like calcium in stopping the beats. Barium, however, acted very differently, for the beats started at once, and were very forcible. They did not last so long, the barium seeming to be more poisonous than pure sodium chloride.

It was thought that perhaps the calcium in the sea water prevented the beating of the central part of the bell in that medium. To test this, NaF and Na_2HPO_4 were added to sea water. When a little more than enough to precipitate all of the calcium of the sea water had been added, the central part of the bell acted just as it did in pure sodium chloride solutions. It would seem, therefore, that the calcium in the bell prevents its beating, and that the reason that it beats in those various media is that the excess of calcium is gotten rid of. There seems to be a limit to this diminution of calcium, however, for after a while the beats stop in the sea water to which the NaF or Na_2HPO_4 was added. Then, if the bell be put back into sea water, or solutions containing calcium, the beats begin again, after a latent period of a few minutes. This latent period seems to be the time necessary for some of the Ca ions to diffuse into the bell, or else for the F or PO_4 to diffuse out, or perhaps for both of these changes.

The inference from these experiments is that if a certain equilibrium exists between the sodium and calcium ions, the isolated center of medusa will beat rhythmically. If, however, this equilibrium is disturbed in either way, the beats will be modified or stopped. In ordinary sea water these ions are not present in suitable proportion.

The marginal ring is much less susceptible to the influence of calcium. It will beat in pure sodium chloride solution about as it does in sea water, and about as the uninjured jellyfish does. If calcium be added, even in considerable amounts, the only effect is to slow the beats a little. It will be remembered that the margin contains the central nervous system, and this suggests that while the inhibitory effect of calcium on the muscle is marked, it is very slight in the nervous centers.

Various muscle from the vertebrates is just as sensitive to the action of ions. The most convenient animals to work with are, of course, the cold-blooded ones, because their isolated fragments can be kept alive so much longer.

In the ventricle of the turtle,[7] strips of muscle were cut both from the venous end and from near the apex. Those from the venous end contained ganglia. If these strips are put in the animal's own serum, or in the artificial serum called Ringer's solution, they beat rhythmically. Ringer's solution contains NaCl 0.7 per cent. ($^m/_8$), KCl 0.05 per cent. ($^m/_{150}$) and $CaCl_2$ 0.026 per cent. ($^m/_{450}$). The apical strips did not beat in these liquids, and they only were used in the following experiments.

A strip from near the apex of the ventricle was put in a solution of NaCl about isotonic with the animal's serum. There was a latent period of an average duration of one hour, in which the muscle was quiet. Then rhythmic contractions began. At first the beats were small and infrequent, but they steadily increased in extent and frequency to a maximum, then they gradually faded away and stopped altogether. The average duration of this rhythmic activity was two hours. During this stage the strip grew steadily longer, that is, there was a progressive loss of tone. At the end of this stage the muscle did not react to mechanical or electrical stimuli. These exhausted strips were then put into Ringer's solution. They began to beat again after a few minutes, and continued to do so for twenty-four hours, but somewhat irregularly.

Other exhausted strips were put into a solution containing only NaCl and $CaCl_2$. The $CaCl_2$ at first amounted to only 0.1 g. in a liter. Later it was increased to 0.2 g. In this solution the beats started promptly, were perfectly regular, and continued for several hours, but not for so long as in Ringer's solution. There was also a progressive increase of tone.

To recapitulate, the fresh apical strips, put into sodium chloride solution, began to beat rhythmically after a latent period, the beats continued for about two hours and then stopped, and there was a progressive loss of tone. These exhausted strips could be made to beat again for twenty-four hours somewhat irregularly in Ringer's solution, or for several hours and with perfect regularity in a certain solution of sodium and calcium chlorides, and in this latter solution the tone steadily increased.

If, on the other hand, the fresh strips were put into a solution containing sodium and potassium chlorides in the proportions found in Ringer's solution they did not beat. If the potassium was not too strong the muscle was not harmed, and it would beat for several hours if transferred to Ringer's solution. There was also loss of tone.

If the fresh strips were put into a solution of NaCl 0.7 per cent ($^m/_8$) and $CaCl_2$ 0.026 per cent ($^m/_{450}$) there were vigorous beats for four or five hours. The tone at first decreased, but later there was a steady increase of tone ending in a distinct calcium-rigor. After this rigor developed, there were no further beats in any of the solutions tried. Before the rigor developed, the strips could be made to beat for a long time by transferring them to Ringer's solution.

To determine if possible the effect of oxygen[8] on the muscle, the solutions were boiled and cooled under oil. In these oxygen-free solutions the beats started as before, but lasted for a very short time only. Then solutions containing hydrogen peroxide in addition to the various salts were used. In such solutions an abundant supply of oxygen was provided. The oxygen alone could not start the beats, but if the solution contained sodium chloride also, the beats began and continued without exhaustion for twenty-four hours.

Again, caffeine was tried because of its stimulating effect on muscle. It did not start the beats, but if it were added to the sodium chloride solution, the beats were stronger.

That calcium is not necessary is suggested by the fact that the strips were made to beat in solutions that contained salts whose anions precipitate calcium.

In a recapitulation of the results of these researches one must first note the latent period. This is attributed to shock or else to the time needed for the diffusion out of potassium or other ions. After this, in a suitable environment, the strips beat rhythmically. Sodium and chlorine ions are necessary for the production of rhythmical activity in the apical strips from the turtle's ventricles. Caffeine intensifies the beats but cannot start them. Oxygen cannot start the beats, but it delays the exhaustion noted in sodium chloride solutions, and will cause the renewal of beating after exhaustion in sodium chloride solutions. Oxygen and sodium chloride will keep the beating going as long as Ringer's solution. Solutions of the oxalates that precipitate calcium will let the beats begin if sodium and chlorine ions are present. Sodium salts tend to produce a loss of tone. Calcium tends to make the beats slower and regular, and to produce an increase of tone that will go on to the production of a permanent rigor. Potassium may slow the rhythm, antagonize calcium, especially if sodium is present in normal amounts, and prevents spontaneous contractions in Ringer's solution, or in the animal's own serum.

Voluntary striated muscle also was found to be profoundly affected by ions. The gastrocnemius of the frog has been used in practically all of the experiments. It showed changes in tone, rhythmical contractions and a new phenomenon called "contact irritability."

Changes in Tone.—The experiments on muscular tone[9] were chiefly concerned with solutions much stronger than those in the body fluids. Thus, in Ringer's solution the strength in KCl is about $^m/_{150}$ and of $CaCl_2$ $^m/_{450}$, while the effects mentioned below needed a strength of KCl of $^m/_{80}$ or more. The experiments are interesting, however, and worth noting. If the frog's gastrocnemius was put into a solution of $^m/_8$ KCl, there was, after a short latent period, a very marked tonic contraction that lasted from twenty to one hundred minutes, during which there was no fluctuation whatever in the curve. Other potassium salts had the same effect. Those tried were the chlorate, nitrate, sulphate, iodide, bromide, chromate, bichromate, ferrocyanide, oxalate, cyandide and tartrate.

Weaker solutions had a similar but less intense effect. The weakest that caused distinct tone was $^m/_{80}$, about 0.09 per cent. If the contracting muscle were removed from the KCl solution, and put into $CaCl_2$, the muscle relaxed; or if $CaCl_2$ were added to the KCl solution the contraction was prevented or stopped. By the alternate application of KCl and $CaCl_2$ the muscle beat rhythmically and as rapidly as 70 times per minute. It was found that immersing the nerve only in the liquid had no effect. I have not seen a report of any such experiments with skeletal muscle with solutions comparable in concentration to the blood serum but unstriped muscle[10] was found to react in exactly opposite ways to strong and to weak solutions of these salts.

Rhythmic Contractions.—In another group of experiments[11] the frog's gastrocnemius was put into $^m/_8$ NaCl solution. The muscles soon began to twitch rhythmically just as the heart muscle did, and it continued to do so for several days, or about as long as the muscle lived. When a very small amount of a soluble calcium salt was added, the twitchings no longer occurred, but the muscles lived much longer than in a pure sodium chloride solution. Its living condition was determined by its reaction to other stimuli. This would seem to mean that the reason the frog's skeletal muscles do not beat rhythmically like his heart is that the blood contains Ca ions. The exised muscle itself contains calcium, and if this theory holds, salts of sodium, whose anions precipitate calcium, should have a more powerful effect in causing twitching than the chloride. Therefore, solutions of sodium fluoride, oxalate, carbonate, phosphate, etc., of the proper osmotic strength were tried. The hypothesis found confirmation, for in these solutions the beats were stronger than in the chloride solution.

It has also been shown previously by another experimenter that the injection into the body of living animals of a salt that is apt to precipitate

calcium is followed at once by twitching of all the muscles. It may be possible, therefore, that the accumulation in the blood of such acids, *e.g.*, oxalic acid, might lead to muscular twitchings and irritability. If this should prove to be the case, the condition might be cured by the administration of calcium. Lithium, rubidium and cæsium act like sodium. Magnesium and strontium act like calcium. Barium acts very differently. When a little $BaCl_2$ was added to the sodium solution, the weak twitchings became stronger and more tetanic. In a solution containing only barium the beats occurred and had the same tetanic character. They did not, however, last for more than a few hours. This is doubtless due to the poisonous action of all barium salts. The beats do not take place in sodium chloride of a less concentration than $^{m}/_{10}$, but in $^{m}/_{64}$ $BaCl_2$ they always were seen and sometimes in $^{m}/_{128}$. Such cathions as Zn, Pb and Cd also caused beating, but they are very poisonous except in very dilute solutions, and in the dilute solutions the muscle rapidly imbibes water, which alone suffices to stop the activity. It is, therefore, not surprising that the beating did not last long in these solutions.

Sodium citrate had a very interesting effect. Citric acid does not precipitate calcium in the tissues, but it prevents its action in other ways, preventing the coagulating effect of calcium. It also caused the twitching in much weaker solutions ($^{m}/_{200}$) than did sodium chloride. These experiments have special interest when compared with the medusa experiments where the effect of calcium on the central part of the swimming-bell was very similar. There, too, sodium citrate had a like effect, for if it was added to sea water the isolated center began at once to beat.

Contact Irritability[12]—In the work with voluntary muscle a new phenomenon, called "contact irritability" was discovered. When the frog's gastrocnemius was left for from one to three minutes in various solutions of a sodium salt whose anion precipitates calcium, there was no effect. If the muscle was then taken out of the liquid and exposed to air, it at once went into a condition of tetanus, or made several strong, tetanic contractions. If it was again restored to the solution, it relaxed at once. This process could be repeated many times by alternately putting the muscle into the solution and into air. The salts that acted in this way were sodium fluoride, carbonate disodic-hydric-phosphate, sodium oxalate and also sodium citrate. If instead of being exposed to air the muscle was exposed to oil, cane sugar solution ($^{n}/_{4}$ to $^{n}/_{8}$), glycerin, CO_2 or mercury, the same contractions were noted. The reaction was not due to evaporation, for it occurred in an atmosphere saturated with water vapor; nor to lessening of the hydrostatic pressure, for it occurred in mercury and other liquids under greater pressure than in the original solution. Solutions of the corresponding salts of lithium, potassium, magnesium or ammonium had no such effect. The only salt not a sodium salt that had this effect was ammonium sulphate, and it is interesting to note in this connection that the SO_4 ion acts like calcium in counteracting the toxic effect of pure sodium chloride on cells of fish eggs. Some other experiments suggest that the irritability is due to action on the nerve end-plates rather than on the muscle fibers.

If the nerve alone is put in the solutions, the effect is very different. The muscle and nerve were mounted so that the nerve only was immersed in $^{m}/_{10}$ sodium citrate. No reaction was noticed during the first five mintues, but then the muscle began to contract rhythmically. The beats increased in force and the tone increased, until a condition of tetanus resulted. If the nerve were lifted out of the solution the muscle slowly relaxed. It again contracted if the nerve were restored to the solution, and so on almost indefinitely. After the relaxation of the muscle had taken place in air the nerve was in a state of extreme irritability, so that mere contact with any solid or liquid caused contraction of the muscle. The nerve was more sensitive to electrical stimuli also. These experiments show that ions have a marked effect on the irritability of nerve and muscle, but not enough has been learned about contact irritability to warrant further conclusions.

When these salts were injected subcutaneously into rabbits they had a like profound effect.[13] Ten cc. of $^{m}/_{1}$ sodium citrate solution caused general muscular twitchings, tetanic contractions of the limbs and sometimes general convulsions, reflexes were exaggerated and incoordination of the hind legs was noted. The twitchings began at once at the site of injection, and in ten or twenty minutes on the other side of the body. With repeated smaller doses of the solution, 5cc. daily for a month, a chronic state of hypersensitiveness was produced, and it lasted for a month after the administration of the salt had been stopped.

The action on the intestine of these same salts in purgative doses was studied in rabbits.[13] The rabbit was anesthetized with morphine and its intestines exposed. When the salts were given by mouth or subcutaneously, greatly increased peristalsis was seen after ten or fifteen minutes. The solution was also injected directly into the lumen of the intestine with a similar result. About 30 cg. of sodium citrate (10 cc. $^{m}/_{8}$ solution) was needed. One or two cubic centimeters injected into a vein was as effective, and it acted in one or two minutes. In other rabbits used as controls without morphine or laparotomy, the salts purged in about an hour. The stools were from two to six times the normal amount and were semi-liquid. In the rabbits whose intestines were examined there was always excessive secretion, so that within twenty or thirty minutes, the intestine contained much clear yellow liquid that was not bile. Loops of intestine isolated by ligature showed the same increased secretion. Calcium, too, showed its usual inhibition. The active peristalsis due to the purgative salt could be al-

most entirely suppressed by the injection of a like amount of $^{m}/_{8}$ $CaCl_2$. When the calcium chloride was injected into a vein, the effect in checking peristalsis was noticed within one or two minutes, and within ten to twenty minutes after injection subcutaneously or directly into the lumen of the intestine. Calcium chloride was more effective in stopping peristalsis than chalk.

If the purgative solution was painted upon the peritoneal surface of the intestine it caused a great increase of peristalsis almost immediately. This was promptly stopped by painting a solution of $CaCl_2$ upon the same part of the intestine. In one experiment this alternate stimulation and suppression of peristalsis was repeated sixteen times without any apparent decrease in the effect. Barium chloride, also, acted here as it did elsewhere. It was by far the most powerful, and its poisonous effect was often shown by the death of the rabbit. Barium chloride is used as a purge by veterinarians, the hypodermic injection of a gram being enough to purge a full-sized horse. In the rabbit if a drop of $^{m}/_{8}$ $BaCl_2$ solution was put on the intestine, the circular fibers contracted and formed a deep, ring-like depression, as if the intestine were ligatured. This ring of contraction then travelled down the gut. To counteract the barium chloride about forty times as strong a solution of calcium chloride was needed.

Other experiments with the frog's gastrocnemius show that the presence of oxygen has a marked influence on the muscle.[14] In an atmosphere of oxygen the irritability of muscle persisted for a much longer time than in air, usually lasting for forty-eight hours. If the muscle was kept in air rigor mortis came on within a day; in oxygen there was no evidence of it for three or four days, that is, until the muscle was destroyed by putrefaction. Fatigue is much delayed in oxygen, and if a fatigued muscle is allowed to rest in oxygen it recovers from the state of exhaustion.

Although the aim of this paper is primarily to call attention to experiments, it seems desirable to give a short synopsis of Mathews'[15] conclusions as to the nature of nervous impulses. He says that the transmission of an impulse is associated with the temporary gelation of successive particles of nerve protoplasm, that in fact this wave of gelation *is* the impulse. This gelation is due to electrical change. In motor nerves it is induced by negative electricity, whether in a direct current or in charges of anions. Irritability is increased by conditions that facilitate gelation. These are negative electricity from proximity to the negative pole of a current (which explains katelectrotonus) or from a preponderance of anions. Irritability is lessened or inhibited by conditions that tend to prevent gelation. These are a preponderance of cathions, or proximity to the positive pole. Ions act electrically rather than chemically. In general, all anions stimulate or increase irritability of motor nerves, all cathions depress or inhibit irritability. While the quality of the effect depends upon the sign of the charge, the different quantitative effects of the various ions depend upon the amount of the charge, which varies with the valence, and also upon the ease with which the ion parts with its charge, in which respect ions vary extremely. The algebraic sum of all these factors determines whether a given salt, or rather a group of ions, will depress or stimulate, and how great the resultant effect will be. This theory is very fascinating, and more work that bears upon it is eagerly awaited.

Much other work has been done along these lines, and one is tempted to go no and recount many experiments on various tissues, but for fear of presuming too much upon your patience I will mention only a few results with some embryonic forms.

Of course there must be some general laws governing the action of all these ions. If these laws can be discovered, the results may be far-reaching. A decided step in the right direction seems to have been made and the effect of ions can be foretold at least in their action on one form of protoplasm.

The eggs of a certain marine fish after fertilization[16] were washed in distilled water to remove the salts. They were then put into solution of known composition. It was found that every solution of a single salt had a poisonous effect, and that the eggs died after a time. The development was carefully watched to determine the least concentration that would kill in thirty-six hours, also in sixty-four hours. To learn the comparative effects of cathions it was necessary to eliminate the effect of the anion. This was accomplished by using the various cathions in combination with the same anion, and chlorides were used for this purpose. The cathions used were K, Na, Ba, Ca, Al, Zn, Fe, Co, H. Cu, etc. It was found that the toxic effect of the cathions varied inversely as their solution tensions. To test the anions it was necessary to eliminate the varying effects of different cathions. This was done by using salts of sodium, those used were the cyanide, hydrate, iodide, bromide, chloride, oxalate, acetate, sulphate, etc. Here, too, the effect was inversely as the solution tension.

Combining the two series of results the effect of any electrolyte is inversely as the sum of the solution tensions of its ions. This law makes it possible to get a formula for comparing the activity of salts that do not have a common ion, provided the solution tensions are known. For example, given that $^{n}/_{3000}$ HCl will kill in twenty-four hours, what strength of KI will accomplish this result? The calculated result was 0.189 **n** KI, the result found by experiment was 0.175 **n** KI, a difference that is within the limits of experimental error. Perhaps further work will be necessary to firmly establish this law, but it is very interesting as a mark of scientific advance, in that it is possible to have a formula for the effect of the various ions on at least this form of protoplasm.

Another series of experiments has brought out some very interesting facts in connection with the development of eggs.[17] The sea urchin is an animal in which the sexes are separate and in which parthenogenesis is unknown. In sea water unfertilized eggs may begin to segment, but the process never goes beyond the earliest stages represented by a group of a few cells. The fertilized egg in sea water almost immediately forms an egg membrane that enclosed the embryo. In the various other solutions tried, eggs that had not been fertilized did not develop this egg membrane except in solutions of calcium chloride and a few other salts, all of which tend to coagulate protoplasm. In these solutions, however, it was not found possible to have the development of the embryo go far enough to be significant.

To eliminate the possibility of chance fertilization as much care was used as in a surgical laparotomy. The dishes and instruments were sterilized, the females were carefully washed in distilled water for a considerable time (distilled water is quickly fatal to the spermatozoa), the eggs were removed by operation, and a very careful and complete series of controls was tried in every case to avoid all the different chances of error. The technic was so effective that no instance of chance fertilization was ever found. With these precautions efforts were made to find something that would cause parthenogenesis. Solutions which are not in themselves too poisonous, and which have a much higher osmotic pressure than sea water were found to answer the purpose. At first the eggs were left in such a solution indefinitely; they did not develop but died. Finally it was found that if the unfertilized eggs were put in a mixture of equal parts of sea water and 2½ n $MgCl_2$ for two hours, and then were put into ordinary sea water, they went through the morula, blastula and gastrula stages, and formed plutei which lived for several days. Plutei are freely swimming forms with an endoskeleton, and one metamorphosis subsequently completes the development.

In a laboratory it has not yet been found possible to have fertilized sea urchin's eggs develop beyond this point, probably because of microorganisms in the sea water. Although the plutei looked exactly like perfectly normal ones, there were some points in which the development differed from that of the fertilized eggs. The fertilized eggs form plutei in about twenty-four hours, the plutei swim about at the surface of the water, and practically every egg develops to this point. An egg membrane is always formed very early. The parthenogenetic eggs develop more slowly, in forty-eight hours or more; they do not develop an egg membrane, and this leads to the production of bizarre forms of irregular shape, due to the fact that the cells are not properly bound together; the plutei do not rise to the surface of the liquid, but swim around near the bottom of the dish; a much larger percentage of the eggs die. The striking fact, however, is, that many do develop into plutei that look exactly normal and live about as long and develop about as far as do the fertilized eggs. Solutions of non-electrolytes of equivalent osmotic pressure, such as cane sugar or urea, are as effective as the $MgCl_2$ when used in the same way. Therefore the effect is not the peculiar action of ions.

The eggs of a certain marine annelid, *Chætopterus*,[18] could be made to develop parthenogenetically, at least to a point where free swimming embryos were formed, in the same way and also by treatment for several minutes with sea water to 100 c.c. of which less than 0.4 g. of KCl had been added. Moreover, they developed when left permanently in 100 c.c. of sea water to which 0.007 g. of HCl had been added. It has long been known that a certain form of crustacean, *Branchippus*, can be grown in fresh or sea water, and that when it grows in sea water it assumes such different characters that it had been classified under another genus. Furthermore, in fresh water fertilization is necessary for the development of the eggs, while in sea water parthenogenesis occurs. All this seems to mean that the egg has within itself the power of development, but something from outside is necessary to start the process. Withdrawing water from the egg by osmosis may accomplish this, and also in some forms the presence of certain ions in certain concentrations, which act catalytically, such as KCl or HCl in the annelid mentioned. Perhaps the sea water acts on *Branchippus* eggs in both of these ways.

This paper has presented a somewhat disconnected mass of experiments, but they seem to me to be of great interest. Some facts which have long been known, such as the aggregation effects seen by Darwin in the sun-dew and in other plants also, and the profound change in the morphology and development of the *Branchippus*, assume a new importance. They are no longer isolated phenomena, but are seen to be but illustrations of quite general properties of protoplasm. The protoplasm itself, so long mysterious, is yielding its secrets to the study of colloids and physical chemistry. The study of the effect of ions upon protoplasm has advanced so far that general laws governing their action have already begun to be formulated. Practically all of the experiments have been verified by different observers working under different circumstances in different places, so they are pretty well established.

Work along other lines, such as the ferment action of colloidal solutions, the effect of ions on the kidneys, on nerves, etc., has given results as interesting, but this paper has already reached a sufficient length, so I will not mention them. Work in this field is full of promise; it is extending our knowledge into fields that a few years ago were called "unknowable," and it seems sure to exert a very great influence on the science of medicine.

REFERENCES.

1. Hardy. Proceedings of the Royal Society, No. 66, pp. 95 and 110.
2. Darwin. Insectivorous Plants.
3. Hardy. Journal of Physiology, xxiv, p. 159.

4. Greely. Science, New Series, xvii, p. 980.
5. Lillie. American Journal of Physiology, viii, p. 274.
6. Loeb. Physiology of the Brain, Chap. ii; Amer. Jour. Physiol., iii, p. 383.
7. Howell. Amer. Jour. Physiol., vi, p. 181.
8. Lingle. Amer. Jour. Physiol., viii, p. 75.
9. Zoethout. Amer. Jour. Physiol., vii, p. 199 and x, p. 211.
10. Stiles. Amer Jour. Physiol., viii, p. 269.
11. Loeb. Decennial Publications, Chicago University. Vol. x.
12. Loeb. Amer. Jour. Physiol., v, p. 362.
Zoethout. Amer. Jour. Physiol., vii, p. 320.
13. MacCallum. Amer. Jour. Physiol., x, pp. 101 and 259.
14. Fletcher. Journal of Physiology, xxviii, p. 474.
15. Mathews. Science, New Series, xv, p. 492 and xviii, p. 729.
16. Mathews. Amer. Jour. Physiol., x, p. 290.
17. Loeb. Amer. Jour. Physiol., iii, p. 135 and 434
18. Loeb. Amer. Jour. Physiol., iv, p. 178 and 423.

MEDICAL PROGRESS.

MEDICINE.

Etiology of Toxic Erythemata.—It seems almost impossible to reach any positive grouping manifestations of erythematous skin diseases. JAY F. SCHAMBERG (*Jour. of Cut. Dis.*, October, 1904) makes a laudable effort to reach some tentative working basis for such a classification. (1) Bacterial and protozoal toxins. (2) Ptomains. (3) Leucomains and other metabolic poisons. (4) Drugs. It seems probable that in scarlet fever, measles, rubella, smallpox, typhus, influenza, pneumonia, malaria, gonorrhea, rheumatic fever, cholera, typhoid and so on, rashes are due to products enumerated under the first group. In certain instances, viz., where the exciting agent of the disease is found present in the affected cutaneous tissue, there is proof positive that there is relation between the two. This has not yet been proven definitely for the rashes occasionally seen in purpura and malaria. Under this group also are to be classed the rare urticarial eruptions sometimes seen in patients suffering from circumscribed abscesses, deeply situated. Group 2 comprises the basic organic alkaloids which are produced by the action of bacteria on nitrogenous matter. Vaughn classes them as follows: (*a*) Muscle poisoning; (*b*) fish poisoning; (*c*) meat poisoning; (*d*) milk poisoning; (*e*) cheese poisoning; (*f*) vegetable poisoning. The poison occurring in muscles is not a putrefactive product, for it cannot be found after decomposition has begun. Fish poisoning may result from eating certain species of fish which are always poisonous; from eating fish which are poisonous during spawning season; from eating fish which are affected with bacterial disease and lastly those which have undergone putrefactive change. Ergotism and pellagra are the best examples of vegetable food poisoning. The leucomains belong to two chief groups, the uric acid group and the kreatinin group. Brunton believed that the intellectual apathy seen after overeating is in part attributable to peptones. The author endeavors to show that nearly all of the diseases included in the erythema family, are produced by the presence in the circulating fluids of the body of a chemical poisoning. That these poisons have very widely dissimilar origins is unquestionably true, and yet so closely kin are they as to be almost indistinguishable by chemical analysis. From fifteen to thirty per cent. of patients injected with horse serum develop eruptions. The history of these cases is strikingly similar to that of the exanthemata. The author concludes that it is justifiable to reason by analogy that nearly all cases of erythema multiforme and nodosum, urticaria and purpura, are the results of the circulation of chemical poisons. Even on close examination of the urticarias of nervous origin, it seems probable that these are due to chemical rather than to vasomotor changes.

Early Diagnosis of Pulmonary Tuberculosis.—That the profession must go back to old and well-tried methods—clinical history and physical examination—in making the early diagnosis of this disease, is the opinion of W. F. CHENEY (*Am. Med.*, October 22, 1904). Of the newer methods, sputum examination does not inform early enough; tuberculin may give a reaction when no active tuberculosis is present, and may fail to give a reaction when active tuberculosis is really present; while the X-rays may confirm what physical examination has already discovered, it does not reveal anything that cannot be found out in other ways. Sources of error in diagnosis may be set down as three: (1) Preconceived ideas,—the physician's mind is made up beforehand that the patient has or has not tuberculosis. (2) Inattention to details. The changes that are dealt with in the early stages of tuberculosis are slight, and it is by many little things that by themselves mean nothing, but put together mean everything, that a diagnosis must be reached. (3) Lack of persistence in the examination is often at fault. One investigation is not sufficient, and the evidence must be gone over several times.

Sclerosis and Dilatation of the Coronary Arteries of the Right Heart by Digitalis.—A case is reported by T. V. OPENCHOWSKI (*Berl. klin. Woch.*, October 3, 1904) of rheumatic endocarditis and endarteritis with complicated valvular lesions. On two occasions when given digitalis, the symptoms of broken compensation were aggravated in each instance. The author made a diagnosis of dilatation and sclerosis of the right coronary artery and this was later confirmed by autopsy. Openchowskl some years ago advanced the theory that digitalis manifests a tonic action on the left heart, by distending the left coronary artery and at the same time weakens the workings of the right ventricle, by contracting the right coronary artery. The case noted afforded an opportunity of demonstrating this for the first time on the human subject. The indiscriminate use of digitalis is therefore ill-advised and may lead to serious overtaxing of the right ventricle.

Does Increased Molecular Concentration of the Blood Warrant a Diagnosis of Bilateral Kidney Disease.—This subject is discussed by A. LOEB and C. ADRIAN (*Berl. klin. Woch.*, September 26, 1904), who report a case of carcinoma of the left kidney, with the right perfectly normal and a freezing point of the blood of 0.635° C. They believe that this concentration of the blood in spite of the efficiency of the right kidney, was caused by the suddenness with which the additional work was thrown upon it through the rapid growth of the tumor of the other kidney. They conclude that unilateral kidney disease (excluding other causes) can exist together with increased molecular concentration of the blood, and that it is not justifiable in cases in which a lesion of one kidney can be proved, to conclude that the other organ is also diseased, because the molecular concentration of the blood is raised.

SURGERY.

Nerve Blocking to Prevent Amputation Shock.—It has been claimed that shock in major amputations could, to a large extent, be avoided by the cocainization of nerve trunks previous to their division. For, as stated by Cushing, this injection prevents the conduct of those impulses resulting from the trau-

matic insult which otherwise, by acting reflexly through the medullary centers, might become the chief factors in the production of shock. H. B. GESSNER (*Am. Med.*, Sept. 24, 1904) reports two successful cases in which this method was tried. The first patient was a man suffering with tuberculosis of the right knee and femur, with partial anchylosis. Amputation was decided on through the middle of the thigh and as the posterior flap was being made, the great sciatic nerve was identified. This was infiltrated with 25 mg. of a two per cent. solution of cocaine hydrochlorate, and then divided at the same level. After the amputation was completed, the great sciatic and internal saphenous nerves were injected in similar manner on being drawn out for shortening. The pulse fell from 80 to 62 when the operation was finished. The other operation was performed for condrosarcoma of the right tibia. In this instance only a one per cent. solution was employed with equally good results. There was a later rise in pulse which may have been due to "delayed shock." In neither case did the blocking have any bad effects, and the time required ought to be less than five minutes.

The Iodine Treatment of Suppuration.—Excellent results in the treatment of this condition have been attained by W. S. PUGH (*Am. Med.*, October 15, 1904), who has used in a variety of cases and calls attention to the cheapness and other good qualities of the drug when compared with the many antiseptic preparations on the market. Scalp wounds, which are usually dirty, can be cleaned with normal saline solution and then dried. After being swabbed out with iodine, they may be sutured and good union will usually be obtained. In ulcers of the leg it acts as a germicide and a deodorant, stimulates the formation of granulations, and, even in the case of large ulcers, promotes healing when combined with rest in bed. Inguinal adenitis was treated by free incision, the pus swabbed by means of dry sponges and then the iodine applied to every part of the wound. Where suppuration was not too extensive, closure of the wound with hoops of union by first intention was tried, and with success in many cases. Upon vaginal discharges, particularly those due to the gonococcus, iodine exerts a favorable influence. The discharge ceases in many cases, after a few swabbings. Old tuberculous sinuses following upon tuberculous glands of the neck are very favorably affected and in a number of other surgical conditions it will be found of great value and should always be tried.

Suture Material.—While the field of surgical pathology, bacteriology, and physiology has been widely extended, the more technical aspects have been neglected during recent years, according to v. MIKULICZ (*Deut. med. Woch.*, September 29, 1904). Silk and vegetable fibers are the most prone to give rise to wound infection in places where the entire absence of germs from the wounds cannot be guaranteed. Metal wire is strong, lasting and antiseptic, but cannot well be used for buried sutures. Silkworm gut presents similar characteristics. Catgut and other animal sutures can be made perfectly aseptic, but they are too rapidly absorbed. The author suggests the use of tanned catgut, which is prepared as follows: The strands are wound on glass plates and then immersed for twenty-four hours in a five per cent. aqueous infusion of quebracho bark. Sterilization is done by the Hofmeister method. By this treatment the material gains in tensile strength and its absorption is delayed for at least four weeks, although the process may not be complete for eighty to ninety days. The author has used this material for abdominal sutures after gastric and intestinal operations, and found it very satisfactory.

PATHOLOGY AND BACTERIOLOGY.

Rhinophyma.—The extraordinary tumors, which occasionally develop upon the nose, are matters of interest from a clinical standpoint and more particularly from the pathological. G. W. WENDE and CHARLES A. BENTZ (*Jour. of Cut. Dis.*, October, 1904) report the pathological analysis of five separate tumors occurring in the same patient. The pathological condition presented occurred in a man sixty-nine years old, of German parentage, who had lived in the United States forty years. An excellent photograph of the lesion portrays the tumor as extending from the tip of the nose downward, across the mouth to the center of the chin. He refused to have any investigation practised, because he believed the presence of the tumor prevented him from incurring other infections. The measurements were as follows: Largest diameter from the base, 4¾ inches; transversely, 3¼ inches; at right angles with the face, three inches. In addition to this large one, there were eight smaller tumors on the nose, the the larger of which were pedunculated so as to oscillate freely when the head moved. There was an atrophy of the epidermal layer of the skin over the tumor, the outer layer having disappeared. Huge comedones obstructed many dilated granular orifices. These would refill gradually and discharge the foulest matter. The patient refused treatment until he passed into a comatose condition, when Dr. Bentz made the following notes: Indurated mass between zyphoid and naval, mass painful on palpation, probably hepatic cirrhosis. Five of the nine tumors on the nose were removed including the greatest, which was about twenty-five years old, and the most recent, which had developed only six months before death. The section of these tumors formed an invaluable means of following the history of their development. A most striking change was the enlargement of the sebaceous glands. This was due to the formation of retention cysts. The other marked feature of the case was the extraordinary connective tissue hypertrophy. No mast cells were found, but micrococci and bacilli were plentiful, the latter simulating those described by Gilchrist as occurring in acne vulgaris. Sections of the second smallest tumor stained with osmic acid showed that the epidermis had undergone passive changes, due to an admixture of fat; it was about twice its normal thickness. The pigment of the rete was greatly increased and the horny layer was very much thickened. The sections stained widely on osmic acid, showing that a large part of the increase in size was due to fat. The term adenoma cannot properly be applied to these tumors, because there is no numerical increase. The development of the growths seems to have been dependent very largely upon a dilatation of the ducts of the sebaceous glands combined with extensive fibrous tissue proliferation. The *Demodex folliculorum* was not especially searched for, although short thick bacilli in large numbers were invariably seen in the glandular ducts.

Size of Urinary Stones in Egypt.—There is no question that the Nile country is the home of urinary concretions. FRANK MILTON (*Lancet*, October 1,

1904) reports the history of 159 cases of stones weighing 50 grams and over. His associate, H. M. N. Milton, operated on 113 of these. They are consecutive cases and altogether unselected. All the patients were over fifteen years of age with the exception of nine. The largest stone weighed 995 grams. The largest stones treated as indicated were as follows: By lithotrity, 452 grams; by suprapubic lithotomy, 292 grams; by perineal lithotrity, 387 grams; by left lateral lithotomy, 90 grams. The results were as follows: Lithotrity cases, 84, deaths five, mortality 5.9 per cent. Perineal lithotrity cases, 47, deaths seven, mortality 14.9 per cent. Suprapubic lithotomy cases, 22, deaths 8, mortality 36.3 per cent. Left lateral lithotomy cases, 6, no deaths. The mortality for the cutting operations was 18.9 per cent. For the crushing operations 5.9 per cent. The size of the stone is a very important factor since a patient with a large stone almost invariably has secondary degeneration of the kidneys. The English operators in Egypt are very much in favor of the crushing operation, although they admit that its success depends very largely upon the experience and skill of the operator. It is a mistake to believe that the Egyptian stones are frequently very soft and that they bear a relation at all constant to chyluria. It is true that the soft phosphatic stones do occur in Egypt. Of the 159 cases, not one had chyluria.

Case of Banti's Disease.—Very little is known of the pathology of hepatic cirrhosis with splenic enlargement, the complex set of symptoms, which have been designated Banti's disease. J. F. STRICK and J. F. HODGSON and W. B. ANDERSON (Lancet, October 1, 1904) gave a very detailed history of a case occurring in a married woman, forty-six years old. She had a fall which had produced severe epistaxis. There were profound anemia and a prominent abdomen. The woman believed that at the time of her recent confinement everything had not been taken out of her uterus, and in this manner accounted for the swelling. There had been an unusual amount of liquor amonii and the midwife had said that the baby was drowned in it. There was no sign of syphilis, she having had eleven children with no miscarriages. The skin was shriveled; had no red tint and resembled that seen in malignant cachexia. Pigmentation, however, was marked. Atrophy of every tissue had taken place, so that she was reduced to skin and bone. The spleen, which was immensely prominent, was tender to the touch. It almost touched Poupart's ligament. Its surface was smooth and its consistence firm. The liver was only slightly enlarged, but it was tender. There was no ascites or edema anywhere. The glands were not enlarged. She suffered from no cardiac palpitation. The pulse was weak, soft and varied from 100 to 110. There were 2,380,000 red cells, 4,640 white, the hemoglobin being 36 per cent. The reds were normal. Melena occurred only a few times. Several days before death, her blood showed red cells 1,140,000, leucocytes 3,200, hemoglobin 20 per cent., poikilocytosis marked. She died just five years after the splenic enlargement had been found. Post mortem showed 32 pints of fluid in the abdomen. The spleen was fourteen inches long, 8 inches across and weighed 9 pounds. It was red in color and the fibrous tissue markedly increased. There were patches of cicatricial tissue which looked like infarcts. The capsule was markedly thickened, the liver enlarged, yellowish-brown and smooth. The stomach wall showed no lesions. Bacteriological examinations of the blood taken anti mortem were negative. The microscopical findings of the spleen showed enormous overgrowth of fibrous tissue. The Malpighian bodies were diminished in number and size. Very few red corpuscles were seen. There was much pigmentary degeneration throughout. The liver was also characterized by immense fibrous tissue proliferation. The lobules were, however, not constricted by it, but were rather disorganized, for the proliferation was intercellular. The bile ducts were normal as well as the hepatic arteries. In neither spleen nor liver was there any reaction with iodine or methyl violent. No bacteria were found.

Experimentally Produced Epithelial Metaplasia in the Stomach.—The results of experiments in rabbits and the relations of epithelial metaplasia to carcinoma, as demonstrated by cases reported in the literature, are discussed by G. FUTTERER (*Jour. Am. Med. Ass'n*, October 15, 1904). The rabbit experiments were undertaken for the purpose of studying the relations between mechanical irritation and the development of carcinoma. In a series of experiments on the stomachs of 94 rabbits, a genuine epithelial metaplasia was found in five. In each case a piece of mucous membrane of the stomach was resected and, subsequently, hypodermic injections of a solution of pyrogallic acid made to reduce the percentage of hemoglobin and thus prevent the healing of the defect, the edges of which were exposed to friction by solid food. The animals were killed at varying periods, but many animals had died owing to improper care. The five cases in which examinations showed metaplasia, the latter were undoubtedly genuine epithelial, as an ingrowth, an implantation and a development from a germinal deposit could be excluded. There was no fistula in any of the cases. In all cases the metaplasia was at once followed by a downgrowth. The latter has occurred under considerable growth pressure, as shown by the invagination of the muscularis mucosæ through the greater part of the hypertrophic muscularis propria, and the invagination of the rest of that layer for quite a distance outside that organ. The metaplasia has been followed by what may be termed a practically unlimited proliferation of the squamous cells. Such a downgrowth and an unlimited proliferation of cells are the two principal characteristics of carcinoma. The term metaplasia can only be used here for the metamorphosis of the columnar into the squamous cells, for there is no more metaplasia going on in the pegs, the products of metaplasia. The epithelial cells have nowhere broken through the muscularis mucosa, and the most characteristic peculiarity of carcinoma, the ingrowth into connective tissue, is absent. What would have become of the strands, filled up to the very end with squamous epithelial cells, if the animal had lived longer, cannot be said and further experiments cannot show it. These are the first cases of epithelial metaplasia on record, if a metaplasia in the bladder, which Lubarsch mentions without describing, may be excepted. It is to be remembered that structures considered to be characteristic of the ectoderm have been produced from entodermal tissues, a fact which would make it impossible to uphold a sharp division of the germinal layers. The cases which have been reported, concludes the author, make it clear that epithelial metaplasia is very often followed by the development of a carcinoma, but what the real relations are between

metaplasia and carcinoma is a matter that only can be made clear by further experimental work.

THERAPEUTICS.

Therapeutics of Gout.—ROBIN (*Bull. gen. d. therap.*, No. 16) discusses three types: (1) The acute attack of gout; (2) subacute gout; (3) chronic gout. Colchicum and its active principles is the chief drug. Granules of colchicine, 0.001 gram—four granules at the onset, or during twenty-four hours. Tincture of the seed or root is effective, but variable in strength. To obtain results, 40 to 60 drops a day in doses of 10 to 15 drops at a time is necessary, if a visceral manifestation preceded the articular attack or venal symptoms. The action of colchicum can be aided by local applications, and hot air or steam. Sodium salicylate is useful in subacute gout. In chronic gout, hygiene, regulation of life and drugs are all equally important. In diet, red meats should be excluded. But two-thirds of the diet should be made up from white meats. Of drugs, strychnine and arsenic are valuable.

Treatment of Constipation by Olive Oil.—Kussmaul introduced the injection of olive oil for the treatment of constipation a great many years ago, but the value of the procedure has not been recognized either in England or America. GEORGE HERSHELL (*Lancet*, October 1, 1904) states that while without question it is most valuable in the treatment of cases due to spasmodic conditions, he has found that the methodical use of oil injections, is one of the best means of treating mucomembranous colitis. For some unknown reason it serves to reduce the amount of mucus in a very rapid and satisfactory manner. A third indication for its use is in intestinal atony, which is being treated by electricity. All purgatives should be abandoned and during the first week it is well to remember that there is apt to be a great deal of trouble because the newly inaugurated electrical treatment has not yet become effective. The author injects from three to ten ounces of warm olive oil into the rectum at bedtime. This is retained during the night and usually gives a satisfactory result in the morning. It is important that the oil should be introduced very slowly; otherwise it will be at once expelled. To this end it should be given by means of gravity and not with any form of bulb syringe. A rubber douche bag should of course not be used, but a glass one, and it should be raised only just high enough to allow the oil to flow. It is noteworthy that the nozzle should have an opening in it much larger than that usually employed in aqueous enemata, otherwise it will be blocked by the oil.

Gersuny's Method in Ozenatous Atrophic Rhinitis.—Most rhinologists accept the theory of Taufal, that ozena is due to the length of the nasal cavity in consequence of a defective development of the turbinated bones, this having taken place in such a manner that the mucus is not able to be gradually expelled forward as under normal conditions. This settles on the walls, obstructs the cavity, then dries and becomes putrid. Gersuny, of Vienna, in 1900, published a new method of prothesis, by means of injecting melted vaselin in the tissues, others undertook to build up the atrophied turbinated bones by the use of paraffin. A certain amount of elasticity is essential to the mucous membrane covering the bone to successful operation. This is best determined by the use of a solution of adrenalin applied to the mucous membrane, and any diminution in volume noted, L. GUARNACCIA (*Arch. Inter. de Lary. d'Otol. et de Rhin.*, July-August, 1904), maintains that in all operable cases a disappearance of the most objectionable symptom, viz., the fetid odor, takes place, also an amelioration of the other symptoms, and at times a complete cure. His technic is to employ paraffinated vaselin, which has a melting point of 45° C., sterilized by placing in a kaolin capsule at a temperature of 100° C., for half an hour. The nasal fossæ are cleaned of crusts by tepid formalin ½ per cent., and the use of absorbent cotton soaked in hydrogen peroxide. Because of the artificial resistance caused by the vascular constriction following the use of cocaine and the very slight discomfort caused by the operation, its use is best omitted. A Pravaz syringe holding 2 c.c. with a straight needle 4.5 cm. in length is employed. For a few minutes previous to the operation, the syringe, filled with vaselin, is kept in water at a temperature of 46° to 48° C. By the aid of a large Duplay speculum the reconstruction of the turbinated bones should be begun by introducing the needle at an angle of 40 degrees into the posterior third. Directly after the removal of the needle an absorbent cotton tampon soaked in cold sterilized water should be applied to the nares. This operation should not be oftener than once a week. To completely modify one turbinated 4 to 6 gms. are necessary. The bad effects claimed by many seem due to too large an amount injected at one time, or to the high temperature employed.

Treatment of Medical Hemorrhage.—Medical hemorrhage has been defined as bleeding, which has occurred at a site where hemostatic forceps cannot be applied. FRANCIS HARE (*Lancet*, October 1, 1904) gives a further history of cases of hemoptysis in which the bleeding has been stopped almost instantly by amyl nitrite. He had already commented favorably upon the method in the *Lancet*, August 20, 1904. Thirteen cases, therefore, are brought under consideration with the following conclusions: Twelve ceased within three minutes, the thirteenth having continued to bleed for ten minutes. These were all cases of hemoptysis and the nitrate was given by inhalation. It certainly can do no harm to break a pearl under the nose of a patient suffering from this form of medical hemorrhage, and if this rather insufficient report is to be allowed to give weight, the treatment may be considered capable of much good. The drug acts, as pointed out by the author, by suddenly lowering the peripheral resistance in the systemic arterioles, thus reducing the blood pressure in the pulmonary circulation indirectly through the fall of blood pressure in the left auricle. It is a singular fact that in these thirteen cases, there has been no recurrence of the hemoptysis. This is the more singular when one considers that the action of the drug is extremely evanescent. In but one case did the hemorrhage occur within two hours, and in half of the cases there was no recurrence. It would seem that the period of time during which there is a diminished arterial pressure is sufficiently long for coagulation to become well established. Arguing by analogy, it becomes obvious that in the absence of amyl nitrite, plunging the patient into a very hot bath, would have the same effect. The mouth and nose should be protected from inhalation of the hot air, indeed cold inhalations should be given, if possible. By a reversal of the processes which caused asthmatic dyspnea, migraine and metrorrhagia, these processes should theoretically, at any rate, be limited or entirely abated.

THE MEDICAL NEWS.

A WEEKLY JOURNAL

OF MEDICAL SCIENCE.

COMMUNICATIONS in the form of Scientific Articles, Clinical Memoranda, Correspondence or News Items of interest to the profession are invited from all parts of the world. Reprints to the number of 250 of original articles contributed exclusively to the MEDICAL NEWS will be furnished without charge if the request therefor accompanies the manuscript. When necessary to elucidate the text, illustrations will be engraved from drawings or photographs furnished by the author. Manuscript should be typewritten.

SMITH ELY JELLIFFE, A.M., M.D., Ph.D., Editor,
No. 111 FIFTH AVENUE, NEW YORK.

Subscription Price, including postage in U. S. and Canada.

PER ANNUM IN ADVANCE	$4.00
SINGLE COPIES	.10
WITH THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, PER ANNUM	8.00

Subscriptions may begin at any date. The safest mode of remittance is by bank check or postal money order, drawn to the order of the undersigned. When neither is accessible, remittances may be made at the risk of the publishers, by forwarding in *registered* letters.

LEA BROTHERS & CO.,
No. 111 FIFTH AVENUE (corner of 18th St.), NEW YORK.

SATURDAY, NOVEMBER 12, 1904.

SANITARY ASPECTS OF THE RAPID TRANSIT SUBWAY.

To the people of New York City the opening of the Rapid Transit Subway, on October 27, was an event of the greatest interest. It was the beginning of a new method of transportation in a city where ordinary transportation facilities had failed utterly to carry the people with speed, comfort or decency. It has been said that we are entering upon an era of tunnel building, and that if the present sample of subway proves as successful as expected it will be only a question of time before every important avenue in Manhattan will be undermined and tunnels will run under the harbors and rivers to every outlying section of the city. At the prospect of so vast a development of underground travel it is natural that the public should scrutinize with more than ordinary curiosity the section of road already built. The section is large enough, and has now been in operation long enough, to give a popular idea of what the rest is likely to be. In a strict sense the road is on trial. The public is the judge. Approval means patronage and a generous patronage means building of more roads.

At the present moment public interest in the subway seems to be focused upon the question: "Is it sanitary? Is this newest form of travel free from conditions which may injure the public's health?" New York has had about two weeks of opportunity to judge of conditions as they are and will be in the new subway. There are, of course, certain improvements that will surely take place to ameliorate minor inconveniences. The sanitary conditions, however, are probably at least as good now as they will ever be, for with the collection of dust and dirt in the lapse of time, hygienic conditions will rather deteriorate than improve.

Apparently the chief concern of those who are anxious about the salubrity of the subway relates to the quality of the air. A considerable amount of dissatisfaction is being expressed with respect to the ventilation. Letters of criticism appear daily in the public press, in which patrons of the road point to various fancied causes of alarm. It is said that the air of the subway is warm and damp, and, consequently, ideal for the existence and propagation of bacteria; that the principal agencies which make way with disease germs in the streets, sunshine and rain, are not compensated for by adequate provision for scrubbing, flushing and disinfecting in the subway, except at the stations; that disagreeable odors, heat and dampness, not to speak of unpleasant physical symptoms, such as depression, headache, nausea, accelerated respiration and giddiness occur, and show that the air is not renewed with sufficient frequency. That the introduction of fresh air through the piston action of the trains is impossible on a four-track road; that the cars represent the most primitive construction so far as ventilation is concerned; that the oxygen in the air is sometimes as low as 11 per cent., instead of being about 20 per cent. as it should be; that the amount of fresh air in some of the deeper sections is so small that an accident which would delay a crowded express for a half hour would result in wholesale suffocation, etc.

As to the justice and injustice of many of these criticisms there is thus far no official or material proof. Undoubtedly the air in the subway is stuffy, and has been warmer and damper than the air outside in the period since the road was opened, and it has often been unpleasantly close in the cars. That extremely sensitive persons and those in delicate health may be disagreeably affected by these conditions, as well as by the odors of oil and paint, which have prevailed, there is no room to doubt, but such sensations as have been experienced might equally well be attributed

to the suffocating sense which comes to many people when they know they are underground.

If it be proven that there is a marked reduction in the amount of oxygen, distinctly serious conditions may be developed, for it is believed that diminished oxygen, sudden changes in pressure, of moisture and of temperature in the inspired air, all lead to respiratory difficulties. With the present increase in the incidence of pneumonia, it is not an encouraging prospect to find that just where New Yorkers are likely to be crowded together, there is a dangerous accessory condition for the production of this dread disease.

There are certain features of the new mode of rapid transit that cannot but appeal to the modern sanitarian. The complete absence of sunlight removes one of nature's best safeguards against the undue multiplication of bacteria. Direct sunlight is the best bactericide that we have. In the comparatively warm, moist air of the subway, bacteria of disease are likely to live much longer than they would in the upper outer air. The question of cleanliness then becomes extremely important, and if serious danger from the spread of infectious disease is to be avoided, the cars must be frequently disinfected and must be exposed every day for many hours to the direct effect of sunlight in the open air.

It seems especially unfortunate, in the light of this danger from dirt, that the introduction of a feature of a subway-station decoration not originally included in the plan, and which has only been called to public attention since the formal opening of the tunnel, should have been permitted. We refer to the advertising signs at the stations. The stations were magnificently built for the ready and effective maintenance of sanitary conditions. The perfectly smooth tiling, the deliberate absence of ornamentation of any kind that would invite the clinging of dust particles, the rounded corners that facilitate thorough cleansing, all remind one of the modern hospital in a way that is most gratifying. Now comes the unfortunate introduction of a series of advertising signs, made in such a way as almost to invite collections of dust in and around and behind them.

The medical visitor of the days before the regular opening of the subway had happy visions of the easy methods by which stations could be washed out in every part with a hose and the more uncleanly portions rendered hygienic by means of a bucket and mop; but now there is an end of any such prospect. It will be absolutely impossible to clean in and around these signs and they will go on accumulating dust and dirt, which will be raised up into the air at moments when traffic is heaviest, thus rendering the inevitably insanitary conditions of any continuous tunnel railroad even more dangerous than they were before.

Attention to matters of personal hygiene demand equal attention. The vice of spitting must be vigorously rooted out, and the further vitiation of the air by the fumes of tobacco should not be permitted.

The question of the sanitary condition of the subway, now that the subject has become a matter of serious question, should be taken up and studied thoroughly as its weight and bearing demand. The subject is far too important to be left in the realm of conjecture any longer. The interests of the public, of the Rapid Transit Commission and the Interurban Company require that idle speculation should cease and that the facts about the ventilation and the probability of spreading infectious diseases in the subway should be set at rest.

There is only one way to get at the truth and this is by means of a thorough and careful investigation. Experts should be called, if necessary, who have a recognized skill in the use of analytical apparatus and whose business it is to investigate and prevent the spread of disease. These observations should cover all sections of the road and all conditions of travel. The different effects produced by different conditions of weather should not be overlooked.

It would seem that the Department of Health could apparently undertake such an investigation and that a periodic examination of the subway, including sanitary inspectors and analysis of the air, would form a valuable addition to its regular routine work. If, for any reason, the investigation could not properly be made by the Department of Health, it should be undertaken by the Rapid Transit Commission itself. The Commission has ample means for such a study and the results would very likely produce data which would prove of value in its future work.

"DON'T YOU HEAR THE BABY CRY?"

CLASS legislation is always a difficult matter to attempt, but a little trifle like that would hardly ruffle the serenity of the good dames of Massachusetts, for these most estimable matrons of the old Bay State have been prominent in good works from the time in which they alighted from

their flying broom-handles to deliver their attenuated bodies to the blazing stake up to the present epoch, when their baked beans, fishballs and brown bread have done so much to enliven the murky gloom of the New England Sabbath.

Virtuous and intolerant they have always been; full of good points, which they have invariably insisted in sticking into other people, until the shoulder of Hester Prynne glowed with the scarlet letter of their burning disapproval and Skipper Ireson was tarred and feathered and carried in a cart by the women of Marblehead. But never until this hour have they, as a class, been accused of originality, or have they deviated from the immutable customs of their ancestors, either in the receipt for their doughnuts or in their blind adherence to the bigoted dogmas of the past. Now, however, we learn that a number of women, who have been prominently identified with movements of all kinds for the improvement of the condition of their sex, have incorporated in Massachusetts an insurance company with the avowed object of encouraging maternity by the paying to policyholders of a premium on the birth of children. The scheme is not only new, but is mathematical. Thus the bride with expectations pays $3 monthly assessments. After ten of these monthly assessed payments, which amount, with the initiation fee, to $34, have been made, the assured is entitled to claim a cash payment of $200 on the birth of a living child. If she neglects her opportunities until after the nineteenth payment has been settled she is entitled to $300, which sum increases to $400 after the twenty-eighth, while at any time after the thirty-seventh she can demand a royalty of $500, C. O. D.

Exactly on what plan the arithmetical part of this project is based we do not know. We are not practical actuaries, but it strikes us that unless those eligible have the courage of their convictions in regard to quick sales and small profits, that they would hardly care to enter the pool, and if they did, it is a question if the amount of money on the proposed basis of assessment would hold out to a degree sufficient to meet the obligations. All these schemes, however, seem to belong to those matters that they order better in France. For, this giving of prizes for children while-you-wait and the bonus for large families, is much more adapted to Gaston and Alphonse than it is to Ichabod and Praise-God-bare-bones, and the number of bills looking to the increase of the birth-rate, already introduced into the French Chamber of Deputies, seems to be even greater than the increase of the population itself. Thus one legislator proposes the offering of prizes for large families and the remission of taxes to the happy fathers of many sons. Another interesting suggestion is, that unmarried men shall be ineligible for official positions under the government or municipalities, while the latest bill introduced provides that married men and the fathers of children shall be exempt from military service, and that the French army shall be limited to bachelors only.

The conditions, however, are somewhat different in this country, particularly in the New England States. It has always been claimed that the peasant women of France hoard their money in an old stocking, and the same may be true here, particularly in the seaport towns, the only difference being that in the American case the stocking is invariably a new one. But the "*dot*" is not with us a required stipulation in the marriage contract, and some other reason than a want of money must be found to account for the great preponderance of unmarried women in these rural Eastern communities. According to the last census the unmarried woman comprises 37.4 per cent. of the female population in Massachusetts, while the expression "a Lynn couple," denoting two women and one man, is older than the first census itself, it having, it is believed, originated from the personal observations of Governor Winthrop when he took his English boots to be resoled in that colonial shoe-making center.

What the reason may be for the existence of so many sad, ungathered roses on the New England ancestral tree, it is hard to say. If, as we have been taught, marriages are made in Heaven, then the Massachusetts delegation to the celestial regions must surely have neglected the interests of their fair constituents and have been guilty of "loafing around the throne" to a degree that is more than culpable. For it is here that, after all, the key to the solution really lies. If these worthy, but unpractical, colonial dames would only give up their visionary ideas of paying for their future population on the instalment plan, and remembering the advice of the Hon. Timothy Campbell in regard to the "gondolas," would only seek to marry off these spinsters and then "let nature take its course," they would not have to look in the columns of old *Advertisers* for the names which have been so long historic in that good commonwealth. Let them keep on, and they will, with their Dorcas societies; let them send letters of instruction to the fathers, and flannels

to the mothers, for, anything that will serve to keep alive the babies that have been born will also serve to maintain the population beyond the mere counting of the chickens that are already hatched. Let them instruct young mothers how to take care of their children, how to feed them, how to clothe them, and how to nurse them in sickness, as the death-rate among infants is now abnormally high, but do not let them forget that the curve of old-maidism is also steadily increasing, and that the time has come when some active legislation must be taken in the spinster interests.

What this is to be or what course it may take it is difficult to say. The time has passed when a thousand or two Sabine youths could be injected into the social veins of Massachusetts and it might not be possible to de-Corbin-ize the National Guard, but a State that can successfully raise two such utterly different products as Harvard College and J. Laurence Sullivan has more than enough versatility to accomplish this, or, in fact, anything. The autumnal fruit of New England, too, should not be a difficult crop to market. Strong, energetic, capable, a good housewife, a woman in fact possessed of all the virtues of domesticity, she should not be left to waste her sweetness on the ocean air. Those provincial heirlooms, the feather beds of Massachusetts, made with the live feathers of her native geese, are traditionally soft and warm; the nights on the stern and rock-bound coast are proverbially drear and long; let these good women, with their irrepressible desire to be the ladies of creation, see that the dear *old maid* is no longer left "out in the cold—alone."

ECHOES AND NEWS.

NEW YORK.

Japanese Medical Corps.—Dr. Louis Livingston Seaman, late Major U. S. Volunteer Engineers, delivered an address on his experience while studying the condition of the Japanese Medical Corps during the present war, on Thursday evening, November 10, 1904, at the Calumet Club.

Civil Service Examinations.—The New York State Civil Service Commission announces general examinations to be held December 3, including the following positions: Physician, fourth grade, State hospitals and institutions; resident physician, State industrial school, Rochester. Applications for these examinations must be made on or before November 28. Full particulars of the examination and blank applications may be obtained by addressing the Chief Examiner of the Commission at Albany.

Medical Society of the State of New York.—It is the desire of the Business Committee of the Medical Society of the State of New York to present a good and representative program to the Society at its approaching annual meeting, which comes the last of January at Albany. The Committee, which has already been announced, consists of Drs. Henry Flood, of Elmira, Chairman; A. Edward Davis, of New York; and L. H. Neuman, of Albany, Secretary. The Committee will soon close the program, and before doing so extends an invitation to members and others who may desire to appear upon it to communicate with either member of the Committee soon.

Reorganization of the New York School of Clinical Medicine.—During the past few months there has been a complete reorganization of the New York School of Clinical Medicine, and the following physicians now constitute the Faculty: PROFESSORS—*General Medicine*, Drs. Wm. Brewster Clark and Henry L. Shively; *Surgery*, Dr. S. J. Walsh; *Genito-urinary Diseases*, Drs. Wm. K. Otis, Walter Brooks Brouner and John Von Glahn; *Gynecology*, Drs. Augustin H. Goelet and A. Ernest Gallant; *Mental Diseases*, Drs. Emmet C. Dent and J. Arthur Booth; *Dermatology*, Dr. Robert J. Devlin; *Ophthalmology and Otology*, Drs. John L. Adams and George A. Taylor; *Pediatrics*, Drs. Dillon Brown and Henry C. Hazen; *Gastro-intestinal Diseases*, Dr. Robert Coleman Kemp; *Diseases of the Nose and Throat*, Drs. Max J. Schwerd and James S. Waterman; *Orthopedics*, Dr. Homer Gibney; *Pathology*, Dr. E. E. Smith; *Hydrotherapeutics*, Dr. A. W. Gardner. ASSOCIATE PROFESSORS—*General Medicine*, Drs. T. M. Acken and E. L. Kellogg; *Surgery*, Dr. J. Cameron Anderson; *Gastro-intestinal Diseases*, Dr. C. T. Graham-Rogers; *Genito-urinary Diseases*, Drs. T. M. Townsend and Stern; *Pediatrics*, Dr. H. F. Senftner; *Opthalmology and Otology*, Dr. H. E. Cook. A number of instructors and clinical assistants have been appointed, and new appointments will shortly be confirmed. At a recent meeting of the Medical Board, Dr. John L. Adams was elected President; Dr. A. E. Gallant, Vice-President, and Dr. Robert Coleman Kemp, Secretary.

Charities and Correction.—The Fifth New York State Conference of Charities and Correction is to meet at Syracuse, November 15 to 18 next. The conference was organized five years ago by the State Board of Charities, acting in conjunction with representative philanthropic citizens from all parts of the State, and has proved to be a very successful and popular organization. Its objects are to afford an opportunity for those engaged in charitable and reform work to confer respecting their methods, principles of administration and results accomplished; to diffuse reliable information respecting charitable and correctional work, and encourage cooperation in humanitarian efforts, with the aim of further improving the system of charity and correction in the State of New York. To carry out these purposes the conference holds an annual meeting in November of each year. All who have an active interest in the public or the private charitable or correctional work in New York State are invited to enroll themselves as members of the conference and to participate in the discussions and business of the meetings. The public generally is also cordially invited to attend all the meetings of the conference.

Japanese Physicians in New York.—A Japanese imperial medical commission, which has been making a tour of the health departments of the principal cities of this country and Europe, visited the Health Department building at Sixth Avenue and Fifty-fourth Street last week. The commission consists of Dr. Takamine, Professor of Chemistry in the Imperial University at Tokio; Professor Tanva, of the department of pharmacy in the same university, and Dr. Sato, chief sur-

geon at the university. Health Commissioner Darlington personally conducted the Japanese scientists about the building, and explained the workings of his department. Dr. Sato, spokesman for the commission, declared that the department in this city was better than anything he had seen in his tour, with the possible exception of that at Hamburg, Germany. But in Hamburg, he said, the commission is hampered by legal restrictions, that it does not have liberty of action enjoyed by the health officials of New York.

Sir Felix Semon and Mount Sinai.—Sir Felix Semon made an inspection of Mount Sinai Hospital last week, and had nothing but words of praise for the institution. Accompanied by Dr. D. Bryson Delavan, the senior attending throat specialist, and Dr. George Lefferts, with whom Sir Felix is staying in this city, the English specialist went to the hospital. He was received by Dr. S. S. Goldwater, the Superintendent; F. J. Rieser, the Assistant Superintendent, and the medical staff. Following the inspection Sir Felix said: "This hospital is a tremendous advance over any hospital I have seen. It is the 'acme,' I might say, of hospital perfection. It seems that such accomplishment is only possible in this country, for surely it cannot be done in Europe. You are fortunate in having enormous wealth devoted to such commendable purposes, while we, though we have wealth, unfortunately see it not so commendably applied."

The New Manhattan Eye and Ear Hospital.—The new building of the Manhattan Eye and Ear Hospital, to be erected in Sixty-fourth Street, on a plot of nine lots, just east of Third Avenue, and next door to the Baron de Hirsch Trade School, will be one of the largest, and perhaps the most complete, of the special hospitals of the world. A new structure is needed, as the requirements of the institution have outgrown the accommodations of its present home, at Park Avenue and First Street. In 1903 there were 28,478 outdoor and 2,954 indoor patients; by September 30, 1903, 372,687 patients had been treated since the hospital's incorporation in May, 1869. Plans for the new building, designed by York & Sawyer, have been approved. The cost of the structure will be between $350,000 and $400,000. Ground will be broken before December 1, and it is hoped to complete the building within fourteen months. The edifice will have a frontage of 118 feet and a depth of 125 feet. It will be five stories high. The ground and first floors are given up to the clinics for dispensary work. At the rear of a general waiting room, under a skylight, the superintendent, or one of his assistants, will stand, to sort the clinic patients. All of the first floor other than the general waiting room is given over to the eye department, the two sides of which contain clinics. The second floor is divided through the center, but, instead of having clinics of the same department upon each side, the eastern part is given up to the nose and throat, while the ear department occupies everything on the right of the large waiting room. In the nose and throat clinics the cabinets are arranged in pairs, set out at right angles to the wall, and furnished with gas, electricity, compressed air and plumbing. Each pair of assistants, who will sit at one of these tables with their patients, will be separated from the others by low partitions. Old patients who have already had their cases diagnosed by surgeons will be seated at once on special benches, each one of which has appended the name of the assistant to whom they were assigned at their last visit. Orderlies will keep run of the number of patients waiting for the surgeon and his assistants, and show them in in rotation. Ear clinics are of much the same arrangement, but have in addition ear-testing rooms, which are isolated for sound, and have a range of 25 feet.

Eastern Medical Society.—The Section on Pediatrics of the Eastern Medical Society will meet on Thursday, November 17, at 8.30 P.M., at Clinton Hall, 151-153 Clinton Street. Program: Presentation of Cases; Paper, Chorea-Clinical and Therapeutic Data, by Henry W. Berg, M.D. Discussion by Dr. Joseph E. Winters, Dr. E. D. Fisher, Dr. H. D. Chapin, Dr. Henry Koplik, Dr. Wm. M. Leszynsky, and others.

County Medical Association.—The next regular meeting of the County Medical Association will be held at the Academy of Medicine, November 21, 1904. The following interesting program is provided: (1) Paper: Dangers of the X-ray, by Milton Franklin, M.D. Discussion by Drs. Morton, Albers, Coley. (2) Paper: Medical and Surgical Features of the Russo-Japanese War, by Louis L. Seaman, M.D., Major, U. S. Volunteers. Discussion by Surgeon-general Wyman, Capt. Kerouski and other medical officers.

PHILADELPHIA.

Sanatorium Opposed.—Residents of Mount Airy have petitioned the courts to declare the Dermady Consumption Sanatorium a nuisance and order its removal. The petitioners consider the institution dangerous and also declare that the inhabitants of the tents move about with so little clothing on at times as to amount to a disgrace. Twenty patients are now in the institution.

Oil Plant Injurious to Health.—Numerous suits have been brought by the inhabitants of Marcus Hook against the Sun Oil Company whose plant is said to be injurious to health and also damaging to property. The first suit has been decided by a jury in favor of the plaintiff, a verdict for $1,050 being rendered as damages. More than 200 witnesses were called, 135 testifying for the company that the fumes were not injurious and 70 for the plaintiff that they were. A jury from the United States Circuit Court has since inspected the plant in connection with other cases pending.

Address by Dr. Wiley.—Dr. H. W. Wiley, Chief of the Bureau of Chemistry in the United States Agricultural Department, addressed the Franklin Institute, November 4, on the results of the recent investigations regarding food preservatives. Dr. Wiley said that though most experts regard borax and boric acid as the least harmful of the preservatives commonly employed, the truth of this view must be determined by future experiments. The work already done shows that the miscellaneous and premeditated use of these antiseptics in food is reprehensible. "It is evident that eating small quantities of borax in food, occasionally, would not prove of any lasting injury to the ordinary citizen in good health, but the weak and feeble must be protected, and it is entirely with the grounds of reason that even a very small quantity of an antiseptic of this kind would prove very harmful to a disordered stomach. Similar experiments have been conducted with salicylic, benzoic and sulphurous acids, but the results have not yet been compiled nor have conclusions been drawn. This work is to be continued during the coming year, when it is our purpose to determine the effects of formaldehyde and coloring matter, when added to food, upon health and digestion."

Episcopal Hospital.—Dr. Richard H. Harte has resigned as attending surgeon. The vacancy on the staff will be filled by the Board on November 24.

Increased Help for Health Department.—Councils' committee on Health and Charities has recommended the creation of 18 new berths in the Health Department at salaries aggregating $12,000. The salary of Dr. Hawkes, physician in charge of the insane department of the Philadelphia Hospital, is asked to be made $1,500 instead of $1,000. New fire escapes, fire towers and stairways are to be added to this hospital. The sum of $10,000 is also recommended for the purchase of modern hospital beds.

College of Physicians.—At the meeting held November 2, the minority committee on sites presented their report on the location for the proposed new building of the college. This committee has from the start been dissatisfied with the lot already purchased at Twenty-second and Ludlow streets. After a long discussion of the report the following resolution was almost unanimously adopted: Resolved, that at the present time it is deemed inadvisable for this body to erect a building at the corner of Twenty-second and Ludlow streets. Three other possible sites were discussed. These are at Eighteenth above Spruce; Locust, east of Fifteenth Street, and the present site. A report on these sites will be made at the December meeting.

Special Lectures for County Medical Society.—In pursuance of the suggestion made last winter, the Philadelphia County Medical Society will inaugurate a course of special lectures on November 16. Dr. George McClellan will speak on "The Relations of Anatomy to the Needs of the General Practitioner of Medicine," and Dr. Albert P. Brubaker on "The Nervous Mechanism of the Heart-beat." The lectures are free to the profession though primarily intended for the benefit of the members of the society.

Dr. Cullen Addresses Society.—Dr. Thomas S. Cullen, of Baltimore, by invitation addressed the North Branch of the Philadelphia County Medical Society on November 10, taking as his subject "The Causes of Uterine Hemorrhage." The discussion was opened by Dr. Wilmer Krusen.

University of Pennsylvania Medical Society.—At the meeting of October 28, the following officers were elected: President, Dr. C. H. Frazier; Vice-Presidents, Drs. A. O. J. Kelly and H. D. Jump; Secretary, Dr. H. C. Wood, Jr. Five meetings a year are to be held, in November, January, February, March and April.

Artificial Anus in Typhoid Perforation.—At the Philadelphia Academy of Surgery, November 7, Dr. J. Chalmers DaCosta reported a case of typhoid perforation treated by making an artificial anus, this being the only recovery among the five cases of typhoid perforation he has operated upon. The perforated ulcer was two feet above the ileocecal valve and between these points were many ulcers on the verge of rupture. The condition of the patient was desperate and an anus was formed by Bodine's colostomy. The symptoms of typhoid promptly disappeared but ten days later violent pain in the right iliac region was followed by the escape of fecal matter along the outside of the proximal part of the bowel. This was probably due to a second perforation. The patient has now recovered from resection and lateral anastomosis to cure the artificial anus. Dr. DaCosta concludes that in exceptional, and only exceptional, cases of typhoid perforation, the formation of an artificial anus is advisable.

CHICAGO.

Chicago Men Win Medal.—A gold medal has been awarded to Dr. A. J. Ochsner and Meyer J. Sturm, architect, for hospital plans exhibited at St. Louis. The notification has been received from the president of the superior jury. The plans were entered under charities and corrections, Class 139, and consist of complete plans of four hospitals—a city hospital, a country hospital, a hospital for towns, and a hospital for the treatment of contagious diseases. The latter plan presents a radical departure from any existing hospital structures now in use, and it is upon the marked advantages of this building that much honor has been gained. There were fourteen drawings in all. Meyer J. Sturm is assisting architect in the construction of the new Augustana Hospital, and is making a specialty in the matter of hospital construction.

Donation for New Hospital.—The Presbyterian Board of Missions has received a donation from Mrs. Simon Reed, Lake Forest, of $7,000, to be used for the erection of a hospital at Oroomiah, Persia.

State Board of Health Awarded Medal.—A gold medal has been awarded the Illinois State Board of Health for its admirable exhibit in the section of hygiene at the Louisiana Purchase Exposition.

Stenosis of the Lower Portion of the Esophagus.—At a meeting of the Chicago Medical Society, held November 2, Dr. B. W. Sippy presented a man who, five or six weeks ago, began to have difficulty in swallowing. During the act of swallowing he feels great discomfort below the lower portion of the sternum. There is greater discomfort in swallowing liquids than solids. The onset of the trouble was rather sudden. Some days the difficulty in swallowing is greater than it is on other days, and on these days food is regurgitated without any effort at vomiting. The food does not taste sour, but it is practically regurgitated in the same condition as when it is swallowed. He said that when a patient presents himself with pain in the lower portion of the sternum upon eating, and when food regurgitates, or even before the symptom of regurgitation is present, one should suspect esophageal stenosis. There are many things that produce pain on eating, and among them he mentioned obstruction of the esophagus, ulcer of the cardiac end of the stomach, carcinoma of the cardiac end of the stomach, perigastric inflammation, either acute or chronic, perigastric adhesions, epigastric swelling, etc. Dr. Sippy introduced an esophageal bougie of large size and located the obstruction in the esophagus at about forty centimeters from the incisor teeth, the obstruction being near the cardia. A diagnosis of esophageal stenosis at its lower portion was made. After considering at length the differential diagnosis, he said it is advisable to place the esophagus as near at rest as possible. There should be as little irritation of it as possible by giving foods that are mushy in character, neither too hot nor too cold, which will pass readily without causing irritation. Mikulicz, he said, fed a patient through the gastrostomy wound for five years, and still the spasm continued. He subsequently cut down through the gastrostomy wound and forcibly stretched the cardiac orifice, producing a submucous rupture of the fibers, and the patient has had no trouble since. He has operated on three other cases since, with good results. Cases that are recognized early may be so managed that the process does not continue. Spasmodic esophageal stricture may continue for a period of a few months, then followed by spontaneous recovery. But once dilatation occurs, it is very improbable that a patient ever recovers, and

sooner or later there comes a time when there is so much spasm that the patient can no longer obtain a sufficient quantity of food for nourishment. Some cases go on to death in two or three years, while others live many years, but it is a serious condition after dilatation is once present. Dr. Sippy then passed the esophagoscope (having preceded it with thorough cocainization of the esophagus), so that the members could see the point of constriction through the instrument. He said in this case a bougie would be passed day by day; the patient would be given food that was non-irritating; also between thirty and forty grains of bromide of sodium every four hours, and the patient's body would be given as much rest as possible. With this line of treatment he hoped to succeed finally in overcoming the spasm, as there was no ulceration, no erosion, and no sacculation in this case.

Myasthenia Gravis.—Dr. Mortimer Frank read a paper on this subject, saying that it is a rare disease in childhood. Fifty per cent. of the cases have been in the female sex, and between the ages of twenty and thirty years. Only three cases have been reported under the age of ten years. The most important symptoms are ptosis, which was present in over 80 per cent. of all recorded cases; ophthalmoplegia externa, weakness of the muscles of the face, speech, arms and legs. Even more marked than the weakness was the rapid tiring of the muscles on use and upon stimulation by the faradic current. The phenomenon of rapid tiring is usually confined to a few muscles or a group of muscles. Prognosis as regards recovery is practically hopeless. Average duration of the disease from one to three years. Treatment of little benefit. Pathology vague and uncertain. As yet, no characteristic lesions either macroscopic or microscopic. The case reported was in a female child, ten years of age. Ptosis was first noticed in November, 1902. The present condition, bilateral ptosis and external ophthalmoplegia.

CANADA.

Montreal Health Department Annual Report.—The annual report of the Health Department of Montreal for 1903 has just been completed, and it shows that a better system of tabulating deaths and births in that city has been inaugurated. Taking the figure of the population of Montreal as given in the fourth census returns of Canada, completed at the end of April, 1901, by the Federal Government, namely: 267,730 inhabitants, and calculating the probable increase of the city's population up to the middle of the year 1903, the total mortality for the city for that period is 24.39 per 1,000. The mean anual death rate for the past eighteen years, leaving out that for 1885, the year in which the great smallpox epidemic occurred, was 24.77 per 1,000 of the population, while the rate for 1901 was 23.25, and that for 1902 22.58 per 1,000. The rate for 1903 was, therefore, 4.56 less than the mean rate for the preceding eighteen years; 3.04 per 1,000 and 2.37 per 1,000 less than in 1901 and in 1902, respectively. Tuberculosis caused less deaths than in the preceding years. Before 1900 the number of deaths was 692; in 1901, 647; in 1902, 644; while in 1903 the number was only 633. In 1903 there were two deaths caused by smallpox, or eight less than in 1902; 77 by measles, or seven less than in the preceding year; 24 by scarlatina, or 40 less than in 1902, 21 less than in 1901, and 108 less than in 1900. The deaths from diphtheria and diarrhea cannot be compared, as they have been classified according to the new international system. Under the title "diphtheria" are included the deaths from croup, and under the title "diarrhea," the deaths from enteritis. Typhoid fever caused 90 deaths, or four more than in 1902; but 40 less than in 1901, and 30 less than in 1900. Bronchitis caused 224 deaths, or six more than in 1902. Pneumonia (including bronchopneumonia) caused 528 deaths, or 16 less than in 1902.

Marriage-rate and Birth-rate in Montreal.—It will be seen, according to the annual report of the medical health officer of Montreal, that the mean birth-rate of the 16 past years, without distinction as to nationality, was 39.10 per 1,000 of the population. The French-Canadian birth-rate was 49.95 per 1,000 of population; that of other Catholics, 25.95, and of Protestants, 24.96 per 1,000 for the past sixteen years. The total birth-rate for 1903 was 36.08 per 1,000. The rate for that year among French-Canadians was 43.64 per 1,000; other Catholics, 30.69; Protestants, 20.52. The excess of births over deaths was 3,375, distributed as follows: French-Canadians, 2,541; other Catholics, 337; Protestants, 507. The birth-rate in 1903 was 36.08 per 1,000, or 3.02 per 1,000 less than the average for the preceding sixteen years, and yet it is the highest rate since 1896. It is 0.43 higher per 1,000 than in 1902, and 3.54 per 1,000 higher than in 1901. The report gives the marriage rate for 1903 as 10.16 per 1,000 of the population, giving an increase of 1.18 over the mean rate for the preceding sixteen years, on an increase of 0.94 per 1,000 over the rate in 1902, and 2.01 over that for 1901. The marriage rate among the French-Canadians for 1903 was 10.75 per 1,000 of the population, or 0.79 per 1,000 more than the mean rate for the preceding fifteen years, or 1.04 per 1,000 more than in 1902, and 1.28 per 1,000 more than in 1901. Among other Catholics the rate for 1903 was 7.35 per 1,000, or 1.29 per 1,000 more than the mean rate for the preceding fifteen years, or 0.06 and 1.50 per 1,000 more than in 1902 and 1901, respectively. Among Protestants the marriage rate in 1903 was 10.36 per 1,000, or 1.39 per 1,000 more than the mean rate for the preceding fifteen years, or 1.21 per 1,000 more than in 1902, or 32 more than in 1901.

A New General Hospital for Toronto.—Two of the leading members of the Senate of Toronto University waited upon the Premier and other members of the Ontario Government a few days ago and were successful in obtaining the promise that the Government would contribute $100,000 in the scheme for erecting a new general hospital for Toronto. The Government will provide this sum on the condition that the question of sites, it being understood that it would be donated for the purpose of helping the university in the matter of clinical teaching. It is a question whether the out-patient and emergency hospitals should be located where the other buildings are erected, and in view of the fact that for the former Mr. Cawthra Mulock has already donated $100,000 and another $100,000 has been bequeathed for the emergency branch, it would seem that there may be three buildings to be hereafter called the Toronto General Hospital collectively. It was also a condition of the Government's promise to contribute $100,000 that the City of Toronto would contribute a like sum. These amounts would form a handsome sum with which to commence operations for a very complete and up-to-date hospital. The new hospital, when completed, will form one of the finest in Canada, or on the American continent, and will furnish most complete and satisfactory equipment for the prosecution of clinical teaching in connection with the medical faculty of the provincial university.

Nova Scotia Branch of the British Medical Association.—The annual meeting of the Nova Scotia

Branch of the British Medical Association was held in the city of Halifax, October 5, the election of officers resulting as follows: President, Dr. C. D. Murray; vice-president, Dr. W. H. Hattie; treasurer, Dr. G. M. Campbell; secretary, Dr. E. D. Farrell. Council, Drs. Goodwin, Hattie, Hare, Mader, G. M. Campbell, Mathers and Ross.

A Visitor from Dawson.—Dr. J. N. E. Brown, Secretary of the Gold Territory, Dawson, is spending a six months' leave of absence in Toronto, Ontario, and other points in Canada. Dr. Brown was formerly a practicing physician in Toronto and secretary of the Ontario Medical Association.

Toronto University Senate Elections.—The graduates in medicine of Toronto University have elected the following representatives to the Senate of the University, all of the four gentlemen elected being members of the Medical Faculty thereof: Dr. George A. Bingham, Professor Adam H. Wright, Professor Irving H. Cameron and Professor J. Algernon Temple.

Experts to Examine Montreal's Water.—On account of numerous complaints which have been made for years against the condition of Montreal's water supply, the City Council has appointed a commission of experts to make an exhaustive examination of same. The commission will consist of Dr. R. Ruttna, Professor of Chemistry, McGill University; Dr. A. Bernier, Professor of Bacteriology, Laval University; Dr. J. E. Laberge, chemist, bacteriologist and director of the Montreal Civic Hospital, and Mr. Milton Hersey, chemist and city analyst.

Personals.—Dr. Fred. Harvey has succeeded Dr. Tait McKenzie as director of the McGill gymnasium, the latter having gone to Philadelphia to assume his duties as director of the physical department of the University of Pennsylvania.

The Hon. Dr. M. Sullivan, Professor of Surgery in Queen's Medical College, Kingston, Ontario, has just completed his fiftieth year as a disciple of Æsculapius. Dr. Sullivan started the study of medicine at Queen's in 1854, and is still in harness.

GENERAL.

Alien Asylum Inmates.—A report from the local United States immigration inspectors has been forwarded to Frank P. Sargent, commissioner of immigration, on certain frauds perpetrated by aliens. The Administration has discovered that in nearly every State in the Union a large percentage of the inmates of asylums for orphans and aliens are persons who have been sent to this country especially for the purpose of being placed in such institutions, where the treatment is better than the care given in European institutions. The report deals with institutions in this district. The facts will be presented to Congress. Those who have carefully studied the paper of W. A. White, Superintendent of the Government Hospital for the Insane, can draw the same conclusion from his figures.

Harvard Buildings.—The new Harvard Medical School buildings now in course of construction are so far advanced that a good idea can be obtained as to what the general appearance of the completed group will be. They are situated on Longwood Avenue, Brookline, at one border of the Parkway system surrounding Boston, and are about fifteen minutes' ride on electrics from the present medical school back of the Public Library. The plan is that of a large court, 75-100 yards square, one open and facing on the street, two sides occupied by school buildings proper, and at the head of the court on a raised terrace the administration building. White marble is used throughout, the architecture is simple, and the whole effect when completed will be very beautiful. On the right, facing the court are two buildings for hygiene and pharmacology in one, physiology and physiological chemistry in the other, on the opposite side stand the surgery, bacteriology and pathology building, and next to it one for anatomy, histology and embryology. Work was begun last November, but was considerably delayed by the severe winter. They will doubtless be completed by next summer, and entered the fall of 1905. At present the exterior of all the structures, except that of the administration building, is finished; of the latter, the foundation and part of the framework is completed. Hundreds of men are engaged and work is progressing rapidly. It is the object of the school to have affiliated hospitals near by, and already several institutions at present in the city and anxious to get into new quarters have availed themselves of offers of building sites, on the large tract of land belonging to the University. Work on the new Samaritan Hospital is nearly completed, and preliminary plans have been made for the new Children's Hospital and the Thomas Morgan Rotch Infants' Hospital. Near by, but further in town, is Simmons College, where nurses in some of the hospital training schools of Boston are, or soon will be, taking courses as part of their regular work. Close to this is the new Tufts College building. Further out in Brookline is the Brookline Women's Hospital and the Baptist Hospital, so a nucleus of a large medical center is here rapidly being formed.

Health Drifters.—Under the title of "The Health-Drifters of the Great Southwest," Frank D. Witherbee writes in the current issues of *Charities*, New York, of the great migration of tuberculosis patients to the Salt River Valley of Arizona, and of the life they lead in tents and shacks in and about Phœnix. Out of a winter population of some 15,000, fully 5,000 are health seekers, drawn to Arizona by the dry climate and constant succession of sunny days which are essential for their relief and cure. Fully 90 per cent. of the days in Phœnix are clear and bright, and the relative humidity of the atmosphere is far below that of the average. "On the one hand these conditions lead to a remarkable percentage of recoveries," writes Mr. Witherbee; "but on the other there is an amount of social and spiritual suffering which is not generally understood. As a matter of fact, a great majority of people go too late to be helped by any power on earth. A Phœnix physician has said that fully four-fifths of the visitors are incurable. The streets are filled with them—thin and wretched, homesick and suffering. Heedless physicians and relatives send patients to Phœnix alone and with scant means of support. The blundering argument is made that all the sick one needs is to get to that country and his condition will permit of his doing light work which he can easily find. But the facts are that this incapacitated one is going to a country swarming with people looking for like chances; that it is essentially a ranching community, where the bulk of the workers to be of any service must be able to plow and sow and reap and herd cattle, often standing in water all night long to irrigate. What few chances there are for light work ought not to be accepted because they are too confining. Here, as wherever consumptives have taken up work in desirable climates, they have by their underbidding and their numbers steadily forced wages down to a point where they can scarcely earn enough to live. Many of the necessities of life by reason of high freight rates are much more costly than in other communities. Out on the desert, at the outskirts of the irrigated parts of the valley, and extending to

the foothills, there are tents of all sizes and description. Some are in groups and others stand alone, some are roomy and attractive, others are cramped and desolate looking. Some of the ranchers near Phœnix have made a specialty of providing accommodations for health seekers, and offer furnished tents or rooms in specially constructed houses with board at the ranch house. The local fraternal lodges, the churches, the county almshouse and the one free sanatorium, are crowded to their utmost capacity year in and year out. Many a patient reaches Phœnix with his small capital exhausted by traveling expenses and finds himself dependent upon the resources of a community which has no interest in him and where he finds on many sides an almost hardened indifference to his pitiable need. This is not because residents of Phœnix are lacking in the finer feelings which prompt to charitable service, but because the people of the East and Middle West are, by their lack of forethought, putting upon them a burden which in no sense belongs to them. The supervisors say that he poor in the almshouse cost the county $20,000 a year, and three-quarters of this is spent in the care of ailing consumptives."

Scientific Disposition of Sewage.—In an article in the *Scientific American,* Charles F. Holden tells of the scientific disposition of sewage in the city of Pasadena, Cal. He says: "The sewage plant, consisting of about fifty miles of pipe, has 650 manholes, 140 flush tanks, and all the modern features which go to make up a perfect system, all of which cost the city in the neighborhood of $313,457. The sewer farm is, roughly speaking, about five miles and a half rom Pasadena, and the outfall pipe is about that length, twenty-two inches in diameter and of vitrified clay. It was placed five feet beneath the surface, having a fall of thirty-one and two-thirds feet per mile. There were several features here not found in the East, where rains flush the sewers continually. There was no rain from May to November, hence rain or a natural flow of water could not be depended upon; yet no serious difficulty has been experienced, the natural flow of the waste water being all-sufficient for the purpose. The farm is in the hands of a practical farmer, who runs it on scientific principles, and for nearly a decade it has been a yearly value-increasing asset of the city. The secret of the success of the Pasadena farm method lies in the application of the sewage. Before planting time a horse and plough form several enclosures on the surface to be planted, after the fashion of the long furrow seen in orange irrigation, the idea being to hold the sewage in a location until the fluid permeates the earth thoroughly and completely as would a good rain, that is, to a depth of three or four feet. This accomplished, it is allowed to dry sufficiently for working, when a cultivator is put on, and the ground from twelve to fourteen inches, the deeper the better, thoroughly cultivated and turned over. This is found in the soil at the Pasadena Sewer Farm to not only prepare the ground for the reception of seeds, but to render it perfectly 'sweet,' so there is no disagreeable odor, the hot sun acting as a deodorizer. So thorough is the work of nature after this simple treatment, that the farm managers state that there has never been a case of illness that could be traceable to the sewage or as a result of working in it. A criticism of such irrigation has been made that certain fruits and grasses may carry the impurities, but this is obviated here by an exact system. Thus so complete is the original irrigation that a later application is not necessary, as in the case of pumpkins or squashes."

To Study Epilepsy.—The fourth annual meeting of The National Association for the Study of Epilepsy, etc., will be held in the Medical Library, "The Fenway," Boston, on November 22 next. The Association invites all persons interested in the welfare of epileptics and in charity work generally, to attend this meeting. Among the papers to be read are the following: Presidential Address, by William N. Bullard, M.D., of Boston; The State's Relation to the Epileptic, by Owen Copp, M.D., Executive Officer of the Massachusetts Board of Insanity, Boston; The Prognosis of Epilepsy, by William Aldren Turner, M.D., of London, England; The Influence of Puberty and Adolescence in the Etiology of Epilepsy, by William P. Spratling, M.D., of Sonyea, N. Y.; Certain Aspects of the Differential Diagnosis Between Hysteria and Epilepsy, by Drs. Putnam and Waterman, of Boston; Some Observations on the Treatment of Epilepsy, by Daniel M. Brower, M.D., of Chicago, Ill.; Spectrum Analysis of the Blood in Epilepsy, by J. W. Wherry, M.D., of Clarinda, Iowa; Syphilitic Epilepsy, by Abner Post, M.D., of Boston; (*a*) Observations on Blood Pressure in the Epileptic; (*b*) Lantern Slide Illustrations of Cases, and of the Massachusetts Hospital for Epileptics, by Everett Flood, of Palmer, Mass; Ten Cases on Special Treatment, by Drs. Morton and Green, of Palmer, Mass.; Lumbar Puncture in Status Epilepticus, by Dr. Morton; Senile Epilepsy, by G. Kirby Collier, M.D., of Sonyea, N. Y.

The objects of the Association are: (1) To promote the general welfare of sufferers from epilepsy. (2)To stimulate the study of the causes and the methods of cure of this disease. (3) To advocate the care of epileptics in institutions where they may (*a*) receive a common school education; (*b*) acquire trades; (*c*) be treated by the best medical skill for their malady. (4) To assist the various States in America in making proper provisions for epileptics.

The officers of the Association are: Dr. Wm. N. Bullard, of Boston, President; Wm. P. Letchworth, LL.D., of Portage, N. Y., Vice-President; Prof. Wm. Osler, M.D., of Baltimore, Second Vice-President; Dr. Wm. P. Spratling, of Sonyea, N. Y., Secretary and Treasurer.

CORRESPONDENCE.

OUR LONDON LETTER.

(From our Special Correspondent.)

LONDON, October 29.

ANTITYPHOID INOCULATION—THE PREPARATION OF DIPHTHERIA ANTITOXIN.

SOME eight years ago it was announced that Dr. A. E. Wright, at that time Professor of Pathology in the Army Medical School at Netley, announced that he had succeeded in preparing a serum, the inoculation of which produced immunity in regard to typhoid fever. He first tested it on himself and on some of the medical officers on probation studying at Netley, and later on the nurses and attendants in a large lunatic asylum near Maidstone, at a time when that town was suffering from a severe visitation of enteric fever. Dr. Wright next extended his experiments to troops going to India, where the disease caused a high rate of mortality among young soldiers. The use of the serum was at first sanctioned by the Indian Government, but later the performance of inoculations in India was forbidden by an Army order. Wright was a member of the Commission sent out to investigate the plague in 1898, and

while he was in India he took the opportunity of inoculating some four thousand soldiers in defiance of the order. The results were said to be so good that on the representations of the Principal Medical Officer with the Government of India, official sanction was given to the use of the serum. During the war in South Africa about 100,000 men were inoculated. After the war the medical service of the Army was reorganized, a principal reform being the formation of an Advisory Board composed partly of eminent civilian physicians and surgeons to assist the Secretary of State for War on medical questions. One of the early recommendations of that Board was that the antityphoid inoculation should be discontinued. Dr. Wright appealed against this decision, and the question was referred to the Royal College of Physicians, which appointed a special Committee to investigate the subject. The Committee reported that "after careful scrutiny of the statistics from both official and private sources which have been made available, we are of opinion that not only is a lessened susceptibility to the disease brought about as a result of the inoculations, but the case mortality is largely reduced." The Committee went on to say: "We are further of opinion that with due care the process of inoculation is devoid of direct danger, but that under special circumstances there may possibly be some temporary increase of susceptibility to infection immediately following inoculation; and it is, therefore, desirable that the preparation of the vaccine and the inoculations should be carried out under specially skilled supervision." This report, however, failed to convince the Advisory Board that its decision against the inoculations had been mistaken. Dr. Wright, on his part, persisted in his efforts to vindicate the reputation of his serum, and a few months ago another Committee of Inquiry was appoined by the War Office. The members of that committee were Dr. C. J. Martin, Director of the Lister Institute of Preventive Medicine; Dr. A. Macfadyean of the same Institute; Dr. Caiger, an acknowledged authority on fevers; Dr. Bruce Low, an Inspector of the Local Government Board; Dr. Bulloch, bacteriologist to the London Hospital; Colonel David Bruce, of the Royal Army Medical Corps, whose name is associated with researches on Malta Fever and Sleeping Sickness; Dr. Galloway, physician to Charing Cross Hospital; Dr. Wright himself and Major Leishman, his successor in the Chair of Pathology at Netley. Colonel Bruce and Dr. Galloway are members of the Advisory Board above referred to, and the former is said to have been an active opponent of the inoculations. This committee reported that "the antityphoid inoculation had resulted in a substantial diminution in the incidence and case mortality from typhoid fever, and recommended that the system introduced by Professor Wright should be resumed in the Army." This recommendation has been adopted by the Army Council, and a commencement is about to be made by inoculating volunteers from a regiment under orders for India. Wright, therefore, would seem to have triumphed over his enemies. Nevertheless, he is not satisfied, and he and his *fidus Achates*, Bulloch, have shaken the dust of the committee-room off their feet, because the carrying out of the inoculations has been entrusted to Major Leishman, who will be assisted by medical officers of the Army. The reason given is that the process is not yet perfect, and its further improvement requires the labor of years, and the work can be done properly only by a permanent committee consisting of civilian experts and army medical officers. Which, being interpreted, means that Wright thinks that the task should have been entrusted to himself. It is only natural that he should think so, as the invention is his and he has so far worked without reward or recognition of any kind from the Government. It may, however, be said of him, as Carlyle's mother said of that prophet of pessimism, that he is "gey ill to deal wi'." He attributes the transference of the management of the inoculations to Leishman to the malign influence of Bruce. This may very well be true, but it is not the whole truth. Moreover, Wright is scarcely entitled to sympathy as a victim of personal hostility, as in his capacity of member of the Indian Commission on Plague, he took an attitude of such opposition to Haffkine, the inventor of a protective serum against cholera, that in the eyes of many the conclusions of the Commission were so vitiated thereby as to be of no real value. He has appealed to the press, and the *Times* of October 27, in an evidently inspired article, has put his case before the public in such a way as to give the impression that he is a martyr of science. This no one who knows him will be disposed to believe. It is quite true that he appears to have been badly treated, but he has a talent for making enemies. Those who know to what an extent such personal jealousies warp the judgments of men whose sole object is supposed to be the discovery of truth may be pardoned if they hold the decisions of scientific commissions just as liable to error as theological councils, and as much subject to the disturbing influence of human passion as political parties.

The Royal Colleges of Physicians and Surgeons have decided to give up the preparation of antidiphtheria serum. The work is, however, to be taken up by the Metropolitan Asylums Board for one year as an experiment. It will be carried on in the same laboratories and with the help of the same scientific staff as heretofore. The Colleges have for some years past issued from 20,000 to 30,000 doses of antitoxin of 3,000 units each, most of which has been used in the hospitals of the Metropolitan Asylums Board. In 1894 the Colleges undertook the bacteriological examination of diphtheria cases in these hospitals. The object was that the treatment might be tested on a large scale. At that time the serum was regarded with considerable doubt not only by the public but by not a few members of the medical profession, and it was believed that if the serum were prepared with the sanction of the Royal Colleges more confidence would be felt in the remedy. The Colleges have no profit out of the work, and their abandonment of it may be taken as evidence that the purpose which they had in view has been fulfilled. Henceforward the serum will not have the guarantee of the Colleges, and the Metropolitan Asylums Board is not in a position to supply anything of the kind in its place. Moreover, if the Board decides to discontinue the manufacture at the end of the year of trial, what is to happen? The preparation of the serum will be left to private enterprise, and as such will be open to the suspicion of commercialism from which it has hitherto been free in this country.

Mme. Curie.—The co-discover with her husband is a comparatively young woman. She was born in Warsaw in 1868. Her father, being an excellent naturalist, encouraged her taste for mathematics and she obtained her degree in that branch at Paris in 1891. Here she met Professor Curie and they were married. Together they have enriched the subjects of physics and chemistry to a remarkable degree.

SOCIETY PROCEEDINGS.

SOCIETY OF THE ALUMNI OF CITY HOSPITAL.

116th Stated Meeting, held October 12, 1904.

Malignant Growth of the Penis.—Dr. Reynolds presented two cases which exhibited a probable malignant growth of the penis. He showed a very graphic oil painting of one of the lesions. In both cases the patients were just over forty years of age, and in each the organ was satisfactorily removed.

Operation for Hemorrhoids.—Dr. Lyle reported a case in which after a simple routine operation for hemorrhoids there had been persistent failures to heal. Four months after the operation Dr. James Tuttle was called in consultation. He said at once that he had recently seen three or four similar cases and before he had examined the patient, he stated that it was probably tuberculous or syphilitic. Pathological report showed it to be the latter.

Appendectomy.—Dr. Lyle reported a case of appendectomy in a woman sixty-five years of age. In less than twenty-four hours after the advent of the first symptom, the abdominal cavity was found full of pus. The symptoms were of an insidious character. The point he emphasized about this case was that through drainage was established through Douglas's sac. A gauze drain passing continuously from the abdominal wound through the vagina. It was in situ for three days and was then removed from below. He considers vaginal drainage of very great importance.

Difficulties in Anesthetization and Their Correction.—Dr. Victor C. Pedersen read this paper. The text of this paper will be found in a subsequent issue of the MEDICAL NEWS.

Dr. J. T. Gwathmey, in opening the discussion on Dr. Pedersen's paper, said that among the many minor points in connection with anesthesia, none seemed to him more important than the fact that in the first and second stages of nitrous oxide anesthesia, the patient can hear and appreciate many of his surroundings. Since the mental condition has unquestionably much to do with the physical post-operative well-being, great care should be taken during these two periods that nothing is said or done to alarm the patient. Another minor consideration is to be found in executing the change from the gas to the ether. As is well known, rigidity often manifests itself at this period, and here perhaps more than anywhere else in the course of the anesthesia, rigidity means deficiency of air. He agreed with Dr. Pedersen that a tracheotomy set should always be a part of the anesthetist's outfit.

As for chloroform as an anesthetic for tonsil and adenoid operations, he would, if left to himself, invariably choose ether, the acceleration of respiration from this admirable stimulant being highly advantageous. He felt that less hesitation should be shown in changing a refractory patient from chloroform to ether or vice versa, than many anesthetists were wont to show. Attention to the purely respiratory conditions of the patient often sufficed to keep the anesthetist busy, and a nurse should be employed to watch the pulse. He invariably gives a bagful of gas with or without oxygen for the last fifteen minutes of an operation, believing, not only that the patient thereby receives less ether, but is enabled to come out of the anesthetic very much more rapidly than is otherwise the case. For vomiting he has found that a substitution of the ether-soaked towels for bowels saturated with cologne, amyl nitrite and spirits of ammonia is often highly efficacious. He closed by saying that he believed that the utmost care should be taken in removing patients from the operating room to their beds.

Dr. Nathan W. Green said, that it was an undoubted fact that, just as in local anesthesia, a patient likes to grasp something very tight in the hands, so in major anesthesia ability to grasp some object is comforting and quieting to the patient. He therefore always reassures and quiets him by having him hold the hands of an attendant very tightly. He further believes that advising the patient that he will, when the mask is put over his face, get nothing but abundance of pure fresh air, is distinctly advantageous. The gas can then be turned on by a quick and noiseless movement almost without the patient's knowing it. Gas anesthesia should not be carried too far, since it predisposes to vomiting in the early stages of ether anesthesia. He believes that a suture through the tongue to hold it in the rare cases in which it cannot otherwise be supported is better than any form of tongue forceps. It is a mistake, in the opinion of the speaker, always to crowd the ether, if a patient is vomiting, for as already suggested such vomiting may be due to other causes, one of which is too profound gas anesthetization. He called the attention of the society to the well-known experiment upon the reptilian heart in which the organ is poisoned by muscarine until it stops beating and is then brought back to normal activity by having a few drops of an atropine solution poured upon it. This should be remembered as indicating the value of atropine in threatened death from circulatory stagnation during anesthesia. Dr. Green believes it to be of very great convenience to have the gas remain connected with the anesthetic apparatus throughout the operation. In his opinion it should not be disconnected at all, but should remain on tap at any moment, for it is the most ready and convenient way to overcome the very inconvenient returns to semi-consciousness, which are by no means uncommon when patients are being kept very lightly under the anesthetic. He is a thorough advocate of the closed method, but as some surgeons insist upon the use of open methods and inasmuch as this seems to work better in a very few cases of alcoholic patients, it is well to have an old-fashioned towel cone at hand.

Dr. Wiesner spoke of the old days of anesthesia and how completely the ancient methods have gone out of use. He expressed his thanks and that of the Society to the experts who had spoken so interestingly on this important subject.

Dr. Waterman believed that the anesthetist in these days of specialization must know more than the operating surgeon about the anesthetic and should be given his choice of what to use.

Dr. Terriberry took issue with this view on the ground that the anesthetist, as an entire stranger and ignorant of the pathological conditions, could not possibly be as good a judge of the type of anesthetic indicated as the operator. It seemed to him that a consultation between the two would give better results.

Dr. Hough spoke of the importance of counting, especially in children. It is a most serviceable way to divert their attention and to save them from panic. He said that atropine should be used judiciously, especially in elderly people, for several cases of glaucoma had resulted from the use of it.

Dr. Pedersen, in closing, said there never was any question in his mind as to the correctness of the belief that when most patients stiffened out, they needed an abundant and free supply of air. He believed that a failure on the part of the operators while removing adenoids and tonsils, to put the patient into Rose's position was responsible for immediate and remote complications much more definitely than the use of chloroform in place of ether. In giving chloroform he considers it essential to administer it drop by drop rather than as is commonly done by intermittent floodings. He agreed with Dr. Green that the patient should be told that a period of suffocation will probably come. If they are prepared for this, they will not mind it. Masseteric rigidity can be conveniently handled by placing a pair of rubber-covered forceps back of the jaw and opening the mouth. This gives the anesthetist both hands free. He disagreed with Dr. Green, however, very vehemently as to the possible indications for the use of the old-fashioned cone. He believes that none exists. As usually made, this cone is a stumpy affair more than half filled with cotton and towels for the reception of the ether. If under any conditions such a shape of cone should be used, it ought to be made at least a foot high so that there shall be an air space of 500 c.c. This represents the average tidal air and is necessary both for safety and for comfort. Dr. Pedersen cited a case which seemed to him to offer positive proof that anybody could be put out with the metal cone without a struggle.

JOHNS HOPKINS HOSPITAL MEDICAL SOCIETY.

Stated Meeting, held October 17, 1904.

Dr. Joseph C. Bloodgood was elected president and Dr. C. H. Bunting secretary for the ensuing year.

Plastic Operation on the Face.—Dr. Stephen Watts exhibited a patient on whom a plastic operation had been done for a wound of the lower lip and chin. The boy, fifteen years old, had been bitten by a circus-pony, and the soft parts, from the mouth down, removed, including the periosteum. The wound was a clean one. A flap was dissected from the upper arm, its under-surface and the raw area left by it being covered by a graft taken from the thigh. After sufficient time had elapsed for the establishment of circulation in the flap it was sutured to the face wound, its pedicle being still left attached to the arm, which was bound up to the chin by a plaster dressing. At the end of three weeks the flap was gradually separated from the arm, the operation being done in several sittings. Photographs of the patient before, during and after the treatment were exhibted, showing the change from a terrible deformity to a fairly normal appearance.

Metastatic-melanosarcoma and Adenocarcinoma of the Umbilicus.—Dr. Cullen reported three gynecological cases: The first, a woman of fifty-eight years, complained of abdominal enlargement, pigmentation and loss of weight, for which no cause could be discovered. There was a small mole on the neck. The abdomen was opened and an umbilicated new growth of the liver and omentum found, which proved to be a melanosarcoma with areas of pigmentation. Metastasis from the mole in the neck seemed probable. The second case, a woman of forty-two years, had been struck on the abdomen, and after three weeks had begun to have a discharge from the umbilicus, around which there was a collar of induration. The inguinal glands became enlarged. The involved area about the umbilicus was excised, and the omentum and glands of the groin removed. The tissue proved to be adenocarcinomatous, and the probable primary site was the umbilicus. The third case was one of a patient who had had a carcinomatous kidney removed one year ago. After seventeen months of health a tumor was noticed developing in the right side, which rapidly increased in size, caused loss of weight, and was accompanied, on admission, by a temperature of 102.5° F. On opening the abdomen the tumor was seen bulging under the liver. It was removed with a knife, after clamping the cystic duct, a suture being placed with a dull needle as the cut was made. The tumor proved to be a metastasis from the carcinomatous kidney. The patient convalesced without event and was discharged four and one-half weeks after operation. Macroscopically there was apparently little liver destruction. Round, blunt, knife-blade needles were used in this case, following the suggestion of an assistant of Mikulicz, who showed that with proper needles the liver could be sutured almost with impunity, all vessels being pushed aside and no bleeding occurring from the stitch hole.

Dr. Futcher, in the discussion, referred to Dr. Keen's paper on the importance of pigmented moles, and reported a case of a colored man with a mole on the right scapula whose axillary glands showed melanotic sarcoma.

Recurring Phlebitis of Obscure Origin.—Dr. Briggs, of Washington, D. C., read a paper on Spontaneous Phlebitis. A review of the literature and a consideration of his own cases, led him to the conclusion that there exists a definite group of phlebitis cases characterized by the absence of any inflammatory cause, by a progressive and relapsing course, by frequent occurrence in the veins of the extremities, the clinical similarity to gouty phlebitis but by the absence of symptoms of the lithemic diathesis. The case reported first was said to be characteristic of the group, and the symptoms were given in detail. The patient was a man, aged twenty-two years, and in splendid health. The family history was negative for gout. The patient had had typhoid and pneumonia, but had never done any particularly hard work. In May, 1901, he suddenly awoke with stiffness of the left ankle, followed, in a day or so, by tenderness over the internal malleolus. The internal saphenous vein could then be felt as a cord, and redness and edema, with some lameness, appeared. The acute symptoms subsided in two weeks, a palpable cord being left at the site of the original trouble. In July there was a second attack quite similar to the first, except that it involved the vein higher up. The onset was sudden and without cause, there were redness, tenderness, swelling and pain, and at the end of two weeks the acute symptoms completely subsided, leaving a palpable cord behind. General health remained good, and there was no leucocytosis. In September, October and December similar attacks occurred, the involvement being gradually higher until Poupart's ligament was reached. The onset was always at night, and there was never any warning. Disability was great, edema never marked, and the hemoglobin constantly high. No treatment was used, except cold applications, and the possibilities of embolism were completely disregarded. At present there is a palpable cord reaching to the middle of

the thigh. No edema is present, but there is occasionally a sense of fatigue. About 350 cases of spontaneous thrombosis are reported in the literature, but all of these are probably due to fevers, anemia or cachexia. Tuckwell and Paget, indeed, make the statement that every so-called spontaneous phlebitis is really gouty, a venous thrombosis being, for these authors, as pathognomonic as a tophus and phlebitis being considered not infrequently the sole manifestation of uricacidemia. Dr. Briggs, however, thought that his own case and at least five others in the literature must be considered as a separate group, the absence of any signs of gouty diathesis, the relapsing and progressive course, the obscure etiology and the absence of fever, anemia and cachexia as the cause being the symptom-complex common to all of them. No study of the pathology has ever been made, and any explanation must therefore be based on purely theoretical grounds. It is possible that the first change is in the formation of a sclerosis in the venous wall, and that the patients exhibit an anatomical, rather than a clinical, diathesis. The mortality is probably not high. Rational treatment would seem to be ligation of the saphenous vein above the process in order to prevent the formation of embolus. By the progressive nature of the disease the vein is doomed so that ligation would only accomplish what the malady itself would lead to later.

Coronary Embolism.—Dr. MacCallum showed several pathological specimens. The first was the heart of a man who had died suddenly after a very long illness with endocarditis. The absence of sweats and a relatively low temperature being the features of the case. The right auricle was found free at autopsy, but there were several vegetations on the tricuspid valve. The left auricle was covered with mural vegetations, the chordæ tendineæ were broken, and there were vegetations at the points of closure of the aortic valve. In the left coronary artery there was a corn-like plug similar to the vegetations in the heart. It lay loose in the vessel, there was no propagation of the clot and the vessel wall was intact. These features, together with the sudden death of the patient, seemed to indicate that an embolism had occurred. This condition is indeed rare, and Marie denies it entirely. Welch, however, holds such a position too radical. The cause of the sudden stoppage of the heart after occlusions of the coronaries is not entirely understood.

Polypi in the Intestine.—The intestines were shown of a man who had died after a long illness with dysentery. An abscess had formed in the left iliac fossa connecting with the bowel, and a vesico-rectal fistula had later occurred. Cystoscopic examination had shown what was apparently carcinoma of the bladder. This proved at autopsy to be diffuse papilloma, and throughout the intestine were found little tags of polypoid growth which looked like the remaining bridges left by destruction of the intervening mucosa. The appearance suggested that such may be the origin of certain intestinal polyps. Dr. Cole said that he had seen several patients who gave a history of long dysentery, and who showed on proctoscopic examination, many polypi in the bowel. They had been diagnosed "polypoid colitis," but it was thought possible, in the light of Dr. MacCallum's case, that the papillomata might have been secondary and not causative.

Malignant Endocarditis.—Dr. Thayer showed the heart from a patient who had died with malignant endocarditis. He had had a mitral insufficiency for many years, but had kept busily at work with a systolic murmur audible with the ear a slight distance from the chest. Compensation was then fair, and there were no signs of aortic disease. In April, 1904, the patient was much overworked, and began to show a slight steady fever without other symptoms. Fresh endocarditis was suspected. A soft aortic systolic murmur soon appeared, and the heart began to enlarge; and the patient subsequently died, as the specimen showed, with acute aortic disease. Whenever an old heart case begins to show a slight steady fever the prognosis is bad.

PHILADELPHIA COUNTY MEDICAL SOCIETY.

Stated Meeting, held October 13, 1904.

The President, Roland G. Curtin, M.D., in the Chair.

Case of Subphrenic Abscess; With Illustrative Skiagraphs.—Dr. George E. Pfahler in the report of this case referred to the difficulty in diagnosis of subphrenic abscess, and pointed out the duty of using every known method of investigation. The principal object of the report was to call attention to the aid furnished by careful X-ray examination. The patient gave a vague history of an attack of appendicitis beginning ten days before admission to the hospital. On admission he had some fever (101° F.); pulse, 108; respiration, 32. There was slight tenderness in the right iliac region, with increased dulness in the right lumbar region, and an immovable area of dulness above the liver. He had a leucocytosis of 32,200. A diagnosis of subphrenic abscess was given and a confirmatory X-ray examination was made. This showed the right side of the diaphragm displaced upward. It was immobile, and there was a rise in the outer portion of its curve. The lung was clear above. The patient was operated upon, and one and one-half pints of pus were removed. A careful consideration of these points Dr. Pfahler believed would show the valuable additional information given by the X-ray.

Dr. John B. Shober emphasized the value of the X-ray as a confirmatory method in diagnosis, and as an adjuvant in therapeutic work in combination with other methods of treatment.

Dr. William L. Rodman felt that Dr. Pfahler had placed the profession under obligations to him in bringing to their aid another means of distinct value in the diagnosis of subphrenic abscess. A point of special interest, he thought, was the history of appendicitis, inasmuch as subphrenic abscess is generally supposed to be the result of gastric ulcer. The fact that the line of dulness is irregular in outline, Dr. Rodman felt, enables one to differentiate between subphrenic abscess and empyema, which is apt to be the most confusing condition.

The Therapeutic Use of X-ray.—Dr. S. Mason McCollin referred to the diagnostic aid of the X-ray and to the difference in opinion regarding the results obtained by its use. Cases were cited; one had suffered with epithelioma of the lips, so extensive that several surgeons declined to operate on it. Dr. McCollin had commenced the use of the X-ray on it about the middle of July, with daily treatments for the first two weeks; since then every third day. At present the lips are healed, and there is only one large gland under the jaw, which is not more than half its original size. This patient was exhibited to the

Society. One case of malignant growth of the breast, which had been twice operated upon, with an ulcerated surface of 6 x 8 inches, was relieved of all pain, skin formed over the ulcer and life was prolonged nearly one year. A case of non-malignant warty and painful tumors on the sole of the foot was entirely cured by a few applications of the X-ray. Dr. McCollin has also found the X-ray valuable in the absorption of enlarged tuberculous glands. The glands should be removed by the knife and the X-ray treatment instituted. Especial attention was directed to the advisability of applying the X-ray after all surgical operations for malignant growths.

Value of Radium.—Dr. John L. Shober spoke upon the value of radium as a therapeutic agent and cited a number of instances in which he had employed it with distinct benefit.

Treatment of Malignant Disease.—Dr. Charles Lester Leonard made a plea that the X-ray might have more chance in treatment. He regarded Dr. McCollin's case as a beautiful demonstration of the possibilities of this treatment. The present difficulty is, he said, that the X-ray is being asked to cure practically dead patients. What is wanted is the cooperation of the medical men and the surgeons in the use of an agent which has been shown to have such power. The best means known for the treatment of malignancy, Dr. Leonard stated, is early radical operation, and if to early radical treatment there is added the supplementary treatment by the Roentgen ray, there is a combination of the two methods which scientific medicine has shown most effective in treating this scourge of the human race. He particularly emphasized the fact that it is the duty of the physician to have malignant disease operated on as early as possible, if operation is possible, and to supplement that operation by the Roentgen treatment.

Dr. George E. Pfahler spoke of four cases of mediastinal growth at present under his treatment, one referred to him five months ago by Dr. Charles P. Noble, after the removal of a mass in the axilla. To-day the patient, to all appearances, is in perfect health. The other three cases were of too recent record to speak of the result. Two cases of inoperable carcinoma of the uterus have apparently recovered. Improvement had also been noted in another case of carcinoma of the uterus with involvement of the rectum.

Dr. John B. Roberts asked the opinion of the X-ray men of the difference between the action of the X-ray and radium upon sarcoma and carcinoma, whether it be scirrhus or epithelioma, and whether they had arrived at any distinct "dosage."

Dr. W. S. Newcomet said he believed that the X-ray more readily affected the chronic, if such term might be used, form of malignant growths. The question, he thought, was not so much one of dosage, but of a selection of cases.

Dr. Leonard, in answer to Dr. Roberts, said that a dosage in X-ray is practically the same as the dosage in any drug or other remedy; it depends upon the individual and the case. The treatment for epithelioma, for carcinoma and for sarcoma is widely different. The difference in tube, position of patient, etc., are taken into account. The treatment of sarcoma has been shown to be more effective when it has been divorced completely from operation. In a case of a mass of the tonsil filling the pharynx the growth had disappeared under treatment by the X-ray and the patient had been at work for over a year. The patient had been referred to him as inoperable by Dr. John B. Deaver. Differentiation, he said, is made between various growths. Hard growths are more amenable to X-ray treatment than soft; and the less rapid growths than the rapid growths.

Dr. S. Mason McCollin said he thought the difficulty was that physicians did not realize that the object is to get the effect, and this is to be gotten only by experience. In many cases the X-ray must be used almost to the burning point, when the effect is very rapid. When there was a resultant dermatitis an encouraging effect is secured.

The Value of the Stereoscopic Skiagraphy.—Dr. M. K. Kassabian reviewed the history of stereoscopy and described the methods, principles and technic and the application to the art of skiagraphy. He showed a special table and an adjustable plate changer or holder which he devised and by which he had overcome many difficulties. He exhibited X-ray negatives and prints by means of Wheatstone's reflecting stereoscope; also reduced prints and transparencies made from large negatives, by means of ordinary (refracting) Brewster's hand stereoscope. The value of this method, Dr. Kassabian pointed out to be as follows: In anatomy, in studying the structure of the osseous system, trabeculæ, sinuses, grooves, projections, the exact relations of the articulating surfaces of the joints; blood vessels, bronchi and other secretory and excretory canals; in surgery, in cases of fractures, the amount of deformity, the separation being as plainly visible as if the real skeleton were being observed. In dislocations the method will show the exact existing condition, as an ordinary skiagram cannot differentiate the backward dislocation from the forward one because the shadows will be the same. In examination for foreign bodies the surgeon will see foreign body by this method imbedded in the tissue in the relation to other organs. He urged that the method be employed in hospitals and in colleges in teaching anatomy and in private practice.

MEDICAL AND CHIRURGICAL SOCIETY OF MARYLAND.

Stated Meeting, held October 21, 1904.

The Final Results in the Treatment of Congenital Hips: Two Cases Treated by Lorenz.—Dr. Baer reported seven cases showing the results of operative and non-operative treatment in congenital dislocation of the hip. The first patient, a girl of five, had shown a dorsal dislocation of the left hip with a shortening in Bryant's line of 3 cm. Continuous traction was applied for five weeks, and then by means of forcible extension (Bradford's method) the head was brought to the acetabulum and replaced by the Lorenz method. Six months after operation the position was good and the stiffness then present yielded later to massage. Preliminary extension and the use of the extension apparatus at operation proved useful in this case. The functional result had been perfect. The second patient, a girl of five and one-half years, with shortening, external rotation and atrophy, had been operated on by Lorenz at the Johns Hopkins Hospital. The leg was flexed to 90 degrees and abducted, the abductor fibers being ruptured. The posterior muscles and the tissues in front of the joint were then stretched, and a plaster dressing applied; the leg being flexed on.

the thigh, and the thigh on the abdomen and the leg flexed posterior to the plane of the body. The acetabulum was poor, and Dr. Lorenz gave a bad prognosis. Marked extravasation of blood occurred in the leg, and persisted for four months. The original dressing was removed in nine and one-half months, and the leg redressed. The anatomical result had been perfect (Bryant's line the same length on the two sides) and the functional result was proven, by the exhibition of the patient, to be equally satisfactory. The other patient treated by Dr. Lorenz on the same day had not done so well. The girl was eight and one-half years old, and the case a difficult one. On removal of the plaster nine months after operation the head was found bulging in the groin, 3½ cm. below and medial to the anterior superior spine, showing that an anterior transposition had taken place. The patient was unable to stand. Operation was done, and a rent in the capsule found through which the head of the femur had slipped. The head was replaced and the functional result was finally good. There was, however, about 2 cm. shortening, possible to correct by a bloody operation. In the fourth case reported the head had been brought to the acetabulum by preliminary extension and reduction then accomplished under ether by the Lorenz method. Six months later the head had slipped out, and this again occurred after a second reduction. At operation a rudimentary acetabulum was found and excavated, the head being replaced and the leg put up in *internal* rotation to overcome anterior bending of the neck. The fifth case showed a brilliant result. The patient was a girl of eighteen years, who had suffered with great pain and disability from double congenital dislocation. She was markedly sway-backed, and walked with a monstrous waddle. Both hips were treated by the open method. New acetabula being formed and preliminary traction being used. The patient had had a very good functional result, in spite of the marked coxa vara of both legs. Lordosis, pain and disability had entirely disappeared. One patient was shown whose convalescence after an open operation had been complicated by the formation of adhesions resulting in false ankylosis of the hip-joint. These had, however, been broken up under ether, and the final functional result was good, though a shortening of one-third inch had persisted. A seventh case showed a fair but not perfect functional result after the bloodless Lorenz method. In this patient anterior transposition of the head had occurred, due to anterior bending of the neck and failure to put the leg up in *internal* rotation. The lessons taught by this series of cases were that operative procedure is the method of choice when anterior bending of the neck is present, that preliminary traction is always advisable, that good results may be expected even in older cases, that the bloodless method is the better method in cases under six years of age (except when an anterior twist of the neck has occurred), and that the bloody method is the operation of choice after the sixth year.

Case of Subdiaphragmatic Abscess; Operation; Recovery.—Dr. Trimble showed a patient who had come to him with a history of a sudden attack of great abdominal pain ten days previous. The man was very ill when seen, pulse was 130, temperature high, abdomen distended. Constipation had been marked, but there had been no vomiting. The lower border of the liver reached below the umbilicus, and the heart and lungs were pressed up and out. A diagnosis of abscess was made. Posterior incision under light anesthesia showed an abscess containing pus and air under the diaphragm. Colon bacilli were isolated from the pus. The abscess was thoroughly evacuated, and a tube inserted for drainage. Temperature soon fell, and the liver receded, but signs of pleurisy appearing an aspiration was done, and no fluid obtained. A rib was then resected, and serum and pus found in the pleural cavity. Both wounds healed without event, and the patient was now well, except for retraction of the chest and a thickened pleura. Dr. Trimble also referred to another case of subdiaphragmatic abscess, and Dr. Watson reports two similar cases, in one of which a perinephritic abscess just under the diaphragm had shown, as the first symptoms, pain in the hip and a slight limp.

Tuberculous Cystitis—The Question of its Primary Nature.—Dr. Wholey reviewed the subject of tuberculous cystitis in connection with a case of his own, in which the condition was possibly primary in the bladder. This disease, according to Metz and Halle, never originates in the bladder for the reasons that concomitant lesions elsewhere are constant, vesical lesions are always less advanced, and hence of an obviously later origin than those found in other portions of the genito-urinary tract, and the vesical lesions are usually found near the vesical orifices (urethral or ureteral). The disease varies in its course from a slow, almost benign condition to an acute and very serious one. Sometimes it occasions no symptoms, and is not infrequently first discovered at the examination for life insurance. Spontaneous recovery has been reported by Paget. The treatment is difficult. Some cases are obviously medical, and others surgical; in the intermediate group of cases it is not easy to say what should be done. At a recent French congress in a discussion of the subject it was concluded that local medical treatment is rarely successful, that curettement, etc., are ineffective, that bladder tuberculosis is always secondary, and that nephrectomy is the only treatment for tuberculosis anywhere in the genito-urinary tract. The failure of surgical treatment is due in part to inability to detect the lesion early. When the disease is limited curettage, excision or cauterization may be of use. Dr. Wholey's patient was a man of eighteen years, with slight tuberculous family history, in whose urine albumin had been found one month previous by an insurance examiner. Frequency of micturition then developed without pain. The lungs were free, the kidneys impalpable. The urine contained a small amount of blood and pus, and many tubercle bacilli. Under irrigations of boracic and carbolic acids and injections of strong bichloride solution frequency had become much less marked, the urine clearer and the bladder capacity greater. There was no involvement of the prostate or epididymis, and the case might be one of primary tuberculous cystitis, though no cystoscopy had been permitted by the patient.

St. John's Guild.—A review of the year's work of this estimable charity shows that 2,500 infants and children have been treated at the New Dorp Hospital and that at least 28,000 babies, children and mothers had open-air outings in the floating hospital ship, the Helen C. Julliard.

THE MEDICAL ASSOCIATION OF THE GREATER CITY OF NEW YORK.

Stated Meeting, held October 10, 1904.

The President, T. E. Satterthwaite, M.D., in the Chair.

Mosquitoes and Malaria.—The evening devoted to the general subject of tropical diseases. The first paper, with the above title, was by Major Junius L. Powell, Surgeon U. S. Army. In it he gave the results of a series of investigations during the past summer at Fort Hamilton, N. Y., as embodied in a report which he had recently made to the Government. There had been quite a large number of cases of acute malarial fever among the troops stationed there, but, although mosquitoes were abundant, the most careful and continued search resulted in the discovery of but a single specimen of the *Anopheles* genus. At the same time, there were conditions about the post and in its vicinity which had formerly been regarded as sources of malaria, and he could not believe, from this experience, that there were means other than the *Anopheles* mosquito by which the infection was conveyed.

Tropical Malaria.—The second paper was read by Dr. John V. Shoemaker, Professor of Materia Medica, Pharmacology, Therapeutics and Clinical Medicine in the Medico-Chirurgical College of Philadelphia. During and immediately after the Spanish-American war he had an opportunity of observing this disease as it presented itself among the soldiers brought to the Medico-Chirurgical Hospital. Having referred to the intensity of the clinical phenomena and to the profound modification which in hot countries occurs in the *Plasmodium* itself, he said that with the recognition of the parasite and the knowledge of its transmission by mosquitoes, the conceptions of malarial infection in its different forms have been rendered much more exact. The profession also gained an immensely important advantage in the posession of absolute scientific tests for diagnosis. The study of the *Plasmodium* in its various phases has enabled us to devise the classification based upon purely clinical phenomena. The malarial paroxysm coincides with the sporulation of a group of the parasites contained in the red blood corpuscles. If the *Plasmodium* is present in various stages of development, the discharge of the spores and toxins is irregular. Accordingly, the typical periodicity of symptoms is disturbed, and the fever assumes a remittent or continuous type. Dr. Shoemaker's worst cases were distinguished by the severity of the symptoms and the irregular course of the fever and were accompanied and followed by extreme prostration. Sometimes, but not always, the fever was followed by profuse sweats. One interesting case displayed a chill every morning and every afternoon for two weeks, each chill being succeeded by fever and sweats. One patient went to sleep at night with a violent headache and woke to find himself in a cold sweat, which was followed by a chill and fever, a reversal of the ordinary succession. In many instances there was such a blending of succeeding paroxysms with the febrile rise and fall that the record approached that of a continued fever. Several of the cases were accompanied by severe bronchitis. In a considerable proportion gastro-intestinal symptoms were marked; nausea and vomiting were common, and some of the men complained of much abdominal pain. Diarrhea or dysentery was met with in some instances; diarrhea in the beginning, followed by constipation, was observed in many. In most of the cases the spleen was enlarged; in some there was splenic tenderness without much enlargement. In several cases there was a marked discoloration of the skin, testifying to the alteration of the hemoglobin by the malarial parasite and its liberation from the red cells. In two cases which bore a close resemblance to yellow fever the men lay in a state of stupor attended with low delirium. The urine was often scanty and high-colored, containing bile-pigment. In several instances there was albuminuria, and in one, hematuria. Many of the cases showed a recurrence after a defervescence of ten days or two weeks.

Diagnosis.—As there were being brought into the hospital at the same time about five times as many typhoid as malarial patients, it was necessary to be extremely careful in the matter of diagnosis. Fortunately for accuracy, we are no longer dependent solely upon clinical observation. The presence, on the one hand, of the *Bacillus typhosus* and the evidence of Widal's test, and, on the other, the detection of the malarial parasite, suffice to settle the diagnosis respectively for typhoid fever or malaria. The cases with marked discoloration of the skin were distinguished from yellow fever by the longer continuance of high temperature and, above all, by the presence of the *Plasmodium malariæ* in the blood.

Treatment.—In the treatment quinine was the main reliance. In the worst cases, where the vomiting was so incessant that the drug could not be retained by the stomach, it was given by the rectum in suppository. The endeavor was made to anticipate the paroxysm by introducing into the system as large an amount of quinine as possible, and as a rule five or ten grains was given every two or three hours. In cases with constipation small, repeated doses of calomel produced movement of the bowels and at the same time served to allay gastric irritability. When diarrhea was present, equal quantities of quinine and salol (usually five grains of each) were combined with good effect. In some instances one-quarter to one-half grain of ipecac was incorporated in the suppository. When nervous symptoms were prominent, cannabis indica or monobromated camphor was combined with the quinine. If the bowel was irritable the suppository was preceded by an enema of starch water and laudanum. When the fever was high, the patient was sponged. None of the cases resulted fatally.

Chief Points of Interest.—The chief points of interest in this series of cases, Dr. Shoemaker said in conclusion, were the gravity of the symptoms, the very marked and prolonged debility, the resemblance of some to yellow fever, and of others to typhoid, the diagnostic value of the scientific test, and the efficacy of quinine administered in suppository when the stomach is intolerant.

Is Mortality Necessarily Higher in Tropical Than in Temperate Climates?—This question was discussed by Colonel Valery Havard, Assistant Surgeon General, U. S. Army, and his contention was that it is not. While it is a fact that mortality has been in the past and still is much higher in tropical climates, he believed that this was not because of the inherent effect of physical conditions, and therefore inevitable, but rather the result for the most part of violations of the laws of health, and therefore preventable. The health of cities is the resultant of many factors, of which latitude is only one and, in Dr. Havard's opinion, not the determining one.

Mortality up to the Present Time Higher in Tropics.—It is as yet impossible to state what should be the minimum mortality attainable by modern sanitary science. Taking, as a basis, the death-rate of the City of New York, 18.18 per 1,000 in 1903, we find that in Manila since the American occupation (four years) the rate has been 45.18. That of last year was 40.85, showing an improvement. The rate for Havana during the decade preceding the Spanish-American War was 36. In the City of Mexico it is commonly about 40, while in India it often rises above 100. During the year 1902 our army was almost equally divided between the United States and the Far East. While at home the mortality from disease was only 5.66 per 1,000, in the Philippines (Filipino troops not included) it was 20.85, or nearly four times as large, and for Filipino troops, 22.59. In 1903 medical officers in the Philippines had learned how to contend against the diseases which beset them, and the mortality fell to 11.14 for American and 18.17 for Filipino troops. It is in wartime that disease mortality runs beyond all bounds in the tropics, owing to the rapid dissemination of epidemic infection among large bodies of men. The highest rates from disease in tropical warfare during the second half of the nineteenth century were noted among French troops in the Soudan in 1888-89, when out of each 1,000 men, 280 died, and in Madagascar in 1895, when, to quote one of their surgeons, "everybody was sick and 50 per cent. died." It must therefore be recognized and admitted that up to the present day there has been a greater liability to sickness and death in the tropics.

The Physical Characterics of Hot Climates Capable of Affecting Health.—The physical or meteorological elements in a hot climate capable of affecting health are chiefly two: (1) Great and continued heat; (2) a high degree of humidity. In the tropics the amount of sweat is enormously increased, the results of which are a diminution of the total amount of blood and a decreased arterial tension. The urine is also much reduced, as well as the output of urea. In consequence of excretory function of the kidneys being diminished, more work is thrown upon the liver. Skin and liver are thus liable to be more or less congested, while the lungs are depleted. As, furthermore, tropical air, through heat expansion, contains less oxygen than that of colder latitudes, the result is decreased metabolism. It is an obvious fact, however, that less oxygen is needed in the tropics, since the calorific process is much less active. High humidity prevents free evaporation of perspiration, and must more or less interfere with the process concerned in heat generation and the active destruction and renovating of tissues, upon which depends bodily and mental vigor. Owing, however, to the constant air movements on tropical islands, this decreased evaporation is less than is generally supposed; so that, for instance, the average summer of Havana is less oppressive than that of Washington and all our Southern cities. The great central physiological condition of human health in the tropics is that the production of bodily heat shall be kept down within certain limits. Nature helps by diminishing the proportion of oxygen in the atmosphere, and we should assist by reducing the food, especially the calorifacient articles of diet. We may further assist by avoiding violent exercise and very active mental work. The result of this necessary tropical régime is a reduction not only of heat but also of nervous energy. By the use of a little prudence and discretion the body may be maintained in a state of normal equilibrium; but the loss of energy is chiefly felt by the mental faculties. Thus, the North American or European going to the tropics will generally find it easier to avoid deterioration of body than sluggishness of mind.

Bacterial Life in the Tropics.—Another important effect of heat and moisture is a great increase and multiplication of saprophytes, so that the decomposition of all organic matter is more rapid and complete. While the part played by saprophytes in reference to human health is rather ill-defined, it is not unlikely that they are more beneficial than hurtful. They are doubtless responsible for unpleasant odors, but it remains to be shown to what extent, if any, decaying animal or vegetable matter, however objectionable to our olfactories and our esthetic sense, is a cause of disease. Pathogenic bacteria are abundantly generated in the tropics, but so they are in temperate climates. The cholera spirillum and *Bacillus pestis* develop as readily on the banks of the Thames and the Seine as those of the Ganges, when given a fair chance. Even leprosy was in past centuries as common in Europe as it now is in Asia. The micro-organisms of typhoid fever and pneumonia are much more at home in temperate or even cold climates than in the tropics. The amoeba of dysentery, however, seems to require a constant high temperature. As to the mosquito, that bloody enemy of the human race, we find it everywhere, increasing in number and bloodthirstiness as we go northward, and rendering life unbearable during the short summer in Alaska and within the arctic circle. There is probably not a single State in the Union where the *Anopheles* cannot be found. Even the mosquito responsible for filariasis is not uncommon in our country. It would seem that the *Stegomyia* of yellow fever does not extend very far north, but probably far enough to make possible an epidemic in any of the large cities of the United Staes.

Most of the Diseases Causing High Mortality Preventable.—Dr. Havard then took up in succession the principal diseases which are responsible for the high mortality in the tropics, and endeavored to show to what extent they are preventable by the application of the modern laws of hygiene. The report of the Board of Health of Manila for the year ending in April, 1904, he said, would afford a convenient text. In spite of the best efforts of the skilled sanitarians composing the Board, the death-rate still remains about 40, and evidently conditions exist there over which the authorities have but little control. There is a very high mortality among infants, the chief cause of death being assigned as "convulsions," and with a view to reduce this the Board has had prepared for dissemination among the people a circular, giving simple rules for the care of the new-born and the feeding of infants. It is expected that the education of the masses and their relief from utter poverty will in time materially diminish this unnecessary sacrifice of infantile life. In Havana, where the great bulk of the population is white, and of a higher grade of intelligence than in Manila, the infant mortality is lower than in New York. The disease causing the largest number of deaths both in Manila and Havana is tuberculosis; yet, as indicating that the climate is less at fault than sanitary conditions, we find among the Americans and Europeans living in Manila, about 9,000 in number, only 9 cases during the year, or just one per

1,000. Among our troops in the Philippines in 1902 the rate was 1.27, while it was only 0.50 among soldiers at home; but in 1903 the figures were reversed, 0.26 in the Philippines and 0.86 in the United States, the greater ratio at home being partly accounted for by the repatriation of invalided tuberculous patients. The air cure for tuberculosis is easiest, most practicable, and should be most successful in the tropics, but unfortunately there exists in Cuba and all other old Spanish colonies a deeply rooted prejudice against night air, which is believed to be deadly. This prejudice arose, naturally enough, from the havoc caused by those nocturnal pests, the yellow fever and malarial mosquitoes. When Cubans have learned to screen themselves from the mosquitoes without excluding the air, when they realize the value of free aeration night and day, making use of the flat house-roof as a dormitory, and when they recognize the danger of crowding in tenement-houses, as well as the necessity of clothing their naked children, the chances of reducing the death-rate from tuberculosis to the minimum will probably be better for Havana than for New York. One would naturally suppose that where phthisis is so prevalent, other chest affections would be common, but such is not the case; showing, once more, the specific distinctness of pulmonary tuberculosis. Next to tuberculosis, cholera was until recently responsible for the greatest number of deaths in Manila, but this, like other water-borne diseases, is easily preventable, and the Board of Health has succeeded in extirpating it; so that the reports for March and April of this year do not show a single case.

Dysentery is one of the most dreaded of the endemic diseases of the Philippines, not only because of its mortality of 1.18, but also on account of its tendency to become chronic and inveterate. This disease cannot be so easily checked as cholera, but an uncontaminated water-supply would undoubtedly soon put an end to it. In Cuba dysentery is hardly known, only three or four deaths from it occurring during the year in Havana. Beriberi is a common disease in certain parts of the tropics, in Manila causing almost as many deaths as dysentery. For the most part it attacks natives of poor constitution and undermined vitality, and as it apparently results from unsanitary food and surroundings it would appear to be amenable to the laws of hygiene. Yellow fever was once the scourge of the West Indies and South America. American intelligence and energy, during our occupation of Cuba, showed how easily that dreaded infection can be checked, controlled, and then completely extirpated. Malarial fever, in all its protean forms, is common in all warm countries, producing a mortality of 0.93 per 1,000 in Manila, although not a single death among Americans and Europeans. Considering the great mortality of malarial fever in the tropics, especially as seen in various military expeditions, it would seem that the plasmodium parasite possesses there a degree of virulence unusual in northern countries. The positive results obtained by the use of mosquito bars, as well as door and window screens, in this country, Cuba, Italy, the Philippines and other places demonstrate that the prevention of malarial fever, whether mild or pernicious, is a comparatively simple problem. Certain facts appear to indicate that we have in the tropics one or more non-malarial and still unrecognized types of fever. Bubonic plague produced a mortality of 0.49 in Manila, but only one death from it occurred among Americans and Europeans. Typhoid fever was formerly considered a disease of white races and of temperate or cold climates, but later experience has shown that tropical and semi-tropical countries are also liable to become infected. Its victims, however, are mostly foreigners, natives enjoying a large amount of immunity from it. The prevention of smallpox is simply a matter of vaccination in the tropics, as elsewhere.

Both in the Philippines and Cuba diseases of the nervous and circulatory systems constitute a considerable cause of mortality. While in Cuba Dr. Havard was struck with the number of people suffering from arteriosclerosis, a fact for which he was unable to offer any explanation; but as there were only 18 admissions for diseases of the heart and blood vessels, and not a single death among our 3,274 soldiers in Cuba and Porto Rico during the year 1902, the climate could hardly be considered an important factor. Hepatitis and hepatic abscess are generally the result of dysentery, and disappear with that disease. Leprosy is still too common among the natives of tropical and semi-tropical countries. That it could readily be reduced by strict isolation, and in time completely eliminated, there can be no doubt. As its parasite is also common in Europe and in our Southern States, anchylostomiasis, or hookworm disease, can scarcely be considered a tropical affection. The "sleeping sickness" of Africa is produced by inoculation with its parasite through the bite of a fly, and is therefore amenable to the same means of prevention as malarial fever. Bright's disease and acute nephritis, as well as cancer, are more prevalent in New York than in warm countries, and of diphtheria, scarlet fever and measles it may be said that they are a negligible quantity in the tropics.

Climate Plays But a Secondary Role in the Health of Any Country.—From what has now been said it would appear that the high death-rate of the tropics (aside from the great infant mortality characteristic of all semi-civilized populous countries) is due to endemo-epidemic diseases whose cause and mode of propagation are now pretty well understood, and which, therefore, are to a large extent preventable. As a final conclusion, is it not warrantable to say that the climate plays but a secondary rôle in the health of any country, that mortality is chiefly dependent upon the character, intelligence and knowledge of its inhabitants, of their understanding of the laws of hygiene and the extent to which they apply to their own special conditions? In other words, human health in any country is not according to its climate, but according to its degree of civilization and the quality of its government. For the ten years previous to 1898 the death-rate in Havana, as has been stated, was 36 per 1,000. When the Americans occupied it ordinary hygienic measures were at once applied and enforced, and means devised to provide work and food for the poorer classes. The result was that, notwithstanding the absence of any sewerage system, the mortality fell to 24 in 1900 and to 21.20 in 1902; remaining about the same in 1903, under the Cuban Republic. The writer was inclined to believe that when Havana has carried out its intention of constructing a complete modern sewerage system its rate of mortality will speedily fall below that of New York, and that if the Cuban Republic continues to govern itself with prudence and justice, Havana will become the favorite winter resort of North Americans. The fact that during the year

1902 the death-rate among the United States troops in Cuba and Porto Rico was only 3.36, while among those at home it was 5.66, shows that in those tropical islands as soon as American sanitarians had had time to get the prevalent diseases under control and guard the men from unsanitary influences, the ratio of mortality fell below that of the United States. While the death-rate of Manila is still very high (about 40), during the past year the rate among the American element of the population, which is principally composed of adult males, was only 9.05, and among the Spanish, consisting of the usual admixture of men, women and children, 15.45.

Proper Diet for the Tropics.—The last paper of the evening on this subject, was contributed by Dr. Harvey W. Wiley, of Washington, D. C., Chief of the Bureau of Chemistry, U. S. Department of Agriculture. Experience has shown, he said, that with a change of environment the character of the food must also be changed. If it were true that the activities of the human family were the same in all climates, then the quality of food necessary to furnish energy would be practically the same from the equator to the poles. In point of fact, however, human activity is greater in the temperate zones than it is either at the tropics or the poles, and hence the amount of food used up as energy is greatest in temperate zones. The great variant in food is that part of it which is necessary to furnish heat. As the quantity of food for furnishing heat is largest in the polar region and smallest at the equator, tropical foods should be less of a heat-forming character than those used in the temperate zones, and, especially those used in the polar regions. The kind of food par excellence which furnishes heat is represented by the fats and oils, which differ somewhat from the carbohydrates in that the latter are active both in building tissue and in furnishing heat and energy. As the amount of radiation or loss of heat by radiation is less in the tropics than in either of the other zones, the oils and fats should form only a moderate portion of the diet in the tropics. Furthermore, as the degree of activity is usually less by reason of the character of the climate, the quantity of matter necessary to repair waste tissue is evidently less in the tropics, and hence the quantity of nitrogenous food should be less in tropical than in temperate climates.

Fruit Diet Best.—It so happens that nature provides very abundantly in each zone the character of food which is best suited for that region. Thus, in the tropics the indigenous fruits supply most freely the character of food which seems best suited to the nourishment of the people. A fruit diet, as is well known, is one in which nitrogenous and fat elements are reduced practically to a minimum, while sugar and starch are far more abundant. The Bureau of Chemistry has lately taken up a study of many of the tropical fruits, and a table showing the composition of a number of the most common of these was presented. The principal oil food of the tropics is found in the cocoanut and their chief starchy food is derived from the cassava in some of its numerous varieties. The prevailing characteristics of the natural food of the tropics is found in the excessive quantity of sugar which they contain, or, as in the case of cassava, of starch. The amount of protein is very small, and the amount of oil is, with the exception of the cocoanut, not marked. On the whole, it appears that the natural tropical food is one composed of a large excess of carbohydrates, in which sugar predominates. The using of food suitable to the environment is one of the conditions necessary to the preservation of health, and those who go from temperate to tropical climates should be impressed with the importance of gradually changing the character of their diet from the highly nitrogenous one which is characteristic of the temperate zones to the highly carbohydrate diet which is characteristic of the tropics.

BOOK REVIEWS.

A REFERENCE HANDBOOK OF THE MEDICAL SCIENCES. By various writers. Edited by ALBERT H. BUCK, M.D. Vol. VIII. Umb Zym. William Wood & Company, New York.

DR. BUCK is to be congratulated in the completion of this really masterly work. We welcome him to a well deserved rest. The publishers are also to be thanked for the thorough evidence shown that they have desired to give to the profession a thoroughly good book, and both editors and publishers alike that combined the best reference book with which we are acquainted has been prepared.

We have had occasion from time to time to speak in commendation of this project and its performance, It deserves the highest praise. In some regards we cannot see how it might be improved, a few others, however, deserve a more thorough going over.

In matters of inorganic materia medica there have been many lapses—not in the newer drugs—these have been well and consistently handled, but the older friends of the pharmacopœia have not been taken up in the modern sense at all, and the concepts, already obsolete, will further show the effects of time on them.

Of modern pharmacology, save in isolated spots, there is a distinct lack. Here again, older ideas have been set forth, not so much to the present detriment of the work, but to the future student of pharmacology it will prove uninspiring.

Especially commendable have been the articles on histology, anatomy, embryology and pathology. They have been distinctly modern in the truest sense of the word, and have shown a most gratifying breadth of scholarship not often found in a work of this general nature. We wish that the same criticism might be made of many of the articles on clinical medicine and clinical surgery. Most of them have been very excellent, but far too many seem to have been made to order. The pace set by the major part of the book has been too hot for some of the writers, and their contributions do not show up as well as might be expected. It seems to show that our laboratory workers are more keen than our clinicians—an observation which seems not to have escaped our foreign visitors during the past few years.

Taking the work as a completed system, it is one that should find a wide recognition.

THE STUDENT'S HANDBOOK OF SURGICAL OPERATION. By Sir FREDERICK TREVES, Sergeant Surgeon-in-Ordinary to H. M. the King. New edition revised by the author and Jonathan Hutchinson, Jr. W. T. Keener & Co., Chicago.

THIS charming little book, so conveniently put together for pocket use, is abridged from the new edition of the author's "Manual of Operative Surgery." It is intended primarily for students who are preparing for the final examinations, or for those who wish to operate upon the cadaver. In accordance with this intention, all technical detail has been left out which concerns aseptic precautions, and all matters relating to

living tissues. The anatomy of the parts is touched upon only casually and the sole attention given to instruments is a bare statement of the number and kind required.

A great deal of attention is devoted to the chapters on amputations and on the ligation of arteries.

It goes without saying that from the pen of so famous a writer as Sir Frederick Treves, nothing but the best is to be looked for, and endorsements of his style, and his teaching are hardly in place. From the standpoint of the American student, it is most valuable to have presented in so terse a manner the technic of the master of English surgery. It must be stated, however, that the one possible drawback to the use of the book in this country, lies in the fact that many operative measures, which are in general vogue here, are not to be found in the manual, whereas a good deal is presented which is at variance with our American teachings. This, in a measure, emphasizes the value of the fact already noted that the book presents in the terse and direct manner characteristic of Treves, a simple outline of surgical technic as it is to-day practised in England. For comparative purposes, if not for actual reference use, the volume must be of the very highest service to every student. There is no better means to forge fleeting technical facts into the brains, than a comparing of England's technic with our own.

MEDICAL DIAGNOSIS. Special Diagnosis of Internal Medicine. By Dr. WILHELM V. LEUBE. Authorized translation from the Sixth German Edition, By JULIUS L. SALINGER, M.D., Physician to the Philadelphia Hospital. D. Appleton & Company, New York and London.

LEUBE'S DIAGNOSIS has been the great book in diagnosis among the German-speaking students of the world. It has been one of the most practical and useful of the works of its class, and Dr. Salinger and the Appletons have performed a really meritorious service in placing it before the American student and practitioner of medicine.

There is little doubt that diagnosis rests at the bottom of rational medicine. Without a correct appreciation of the actual pathological conditions, treatment is largely a matter of hocus pocus, a regular Janus, one side deluding the patient, the other the physician himself. One of the healthiest signs of the condition of medicine in this country has been the great number of text-books on diagnosis; and we welcome this old one in its new guise.

The modest introduction to this American edition by the author bespeaks for it a welcome from its numerous friends, and hopes that it may contribute to the stimulation of the pleasure in the development of medical science and the appreciation of diagnostic art. We feel that it will do this and more, it cannot but help to raise to a higher level of professional efficiency all who study it conscientiously.

PRACTICAL MATERIA MEDICA FOR NURSES, WITH AN APPENDIX. By EMILY A. M. STONEY, Graduate of the Training-School for Nurses, Lawrence, Mass.; late Head Nurse Mercy Hospital, Chicago; late Superintendent of Training-School for Nurses, Carney Hospital, South Boston, Mass. Second Edition. W. B. Saunders & Company, Philadelphia, New York, London.

IN a subject of such great scope as Materia Medica, it is almost as important to know what need not be taught as to know what to teach, and as a work for medical students must needs contain much of therapeutics and other things of only secondary importance to a nurse, it is a wise plan to have special books for nurses. Of these special books the one before us is to be commended for its suitability to its purpose. The alphabetical arrangement might be criticized, were it not that the author has given a very good therapeutic classification of remedies in the earlier part of the book. The concise and readable type, the inclusion of many unofficial drugs, the added chapters of Poison Emergencies, Mineral Waters, Weights and Measures, Dose and other lists, Abbreviations and Glossary, and, we might add, the employment of thick but very light paper in the making of the book, induce us to give it our highest commendation. A short chapter on prescription-reading might be added with advantage. The doses are given in both English and Metric Systems.

THE THEORY AND PRACTICE OF INFANT FEEDING, with Notes on Development. By HENRY DWIGHT CHAPIN, A.M., M.D., Professor of Diseases of Children at the New York Post-Graduate Medical School and Hospital; Attending Physician to the Post-Graduate, Willard Parker and Riverside Hospitals; Consulting Physician to the Randall's Island Hospital. Second Edition, revised, with numerous illustrations. William Wood & Company, New York.

IT is only a short time since we commended the author on the readableness of his first edition. There the principles of infant-feeding and the method of obtaining good milk were discussed at length. But so much work has been done recently in this field that the author has found it advisable to introduce new matter in many places. The supposed distinctive difference of breast milk being alkaline and cow's milk acid has been proven a fallacy. Alkalies added to milk prevent the stomach secretions from curdling the milk and enable it to pass into the intestines in a soft or fluid condition. These are some of the newer findings. Many minor changes have been made throughout the book, and it will doubtless be received with favor by physicians, as was the first edition.

A COMPENDIUM OF CHEMISTRY. By Dr. CARL ARNOLD. Translated by Dr. John A. Mandel. John Wiley & Sons, New York.

ARNOLD'S work has always received special support from the student of chemistry, and even the professional man, by reason of its conciseness and philosophic grasp of general chemical principles.

It is particularly opportune to have at this time a translation of so modern a book, and we feel assured that it will serve the useful purpose it has served for so many years in the home of its early appearance.

BOOKS RECEIVED.

YEAR-BOOK OF THE MEDICAL ASSOCIATION OF GREATER NEW YORK. 8vo, 193 pages. Published by the Association.

ACTION OF LIGHT AS A THERAPEUTIC AGENT. By Dr. L. K. Hirshberg. 8vo, 49 pages. Snow and Farnham, Providence.

HOW TO COOK FOOD FOR THE SICK AND CONVALESCENT. By Helena V. Sachse. 12mo, 297 pages. J. B. Lippincott Co., Philadelphia.

STUDIES FROM THE ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH. Volume II. 1904. 8vo, 250 pages. Ilustrated. Published by the Institute.

SUPPRESSION OF TUBERCULOSIS. By Prof. E. von Behring. Translated by Dr. Chas. Voldman. 12mo, 83 pages. John Wiley & Sons, New York.